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Implementation of Medicare CAHPS[®] Fee-for-Service Survey

Final Report for the 2004 Survey

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EXECUTIVE SUMMARY

This report summarizes the methodology and findings of the 2004 Medicare Consumer Assessment of Health Providers and Systems (CAHPS[®]) Fee-for-Service (MFSS) Survey conducted for the Centers for Medicare & Medicaid Services (CMS) by RTI, with the assistance of RAND, Pearson NCS, and Discovery Research Group (DRG). The work was performed under subcontract to the Center for Health Systems Research and Analysis at the University of Wisconsin-Madison (UW), as part of UW's contract with CMS. More detailed information on many of the topics presented in this report is available in the individual project task reports prepared for the 2004 CAHPS MFSS survey.

Section 2: 2004 Medicare CAHPS Fee-for-Service Survey Questionnaire

The CAHPS surveys were developed using comprehensive reviews of the existing literature, focus groups with consumers, cognitive testing of survey content and question wording, and field testing of preliminary versions of individual items. A set of core items was developed for all consumers, and certain items were targeted for special subpopulations, such as Medicare managed care enrollees. The CAHPS items include evaluations (ratings) of care and reports of specific experiences with health plans. This combination of global assessments and reports about different aspects of health plan performance also allows users to link global evaluations with specific information to guide quality improvement efforts.

The MFSS questionnaire is based on the CAHPS core questionnaire for adult, privately insured populations developed as part of the CAHPS research project sponsored by the Agency for Healthcare Research and Quality (AHRQ). In 1998, the MFSS project team conducted a field test on a sample of MFSS beneficiaries in five states to test field procedures and evaluate the psychometric performance of standard CAHPS questions within this population. As a result of this field test, the 12-month recall period for health-related experiences was shortened to 6 months. A 6-month recall period is also used for the Medicare Advantage (MA) CAHPS Survey. A report on the findings of the CAHPS MFSS field test survey is available electronically from CMS. The MFSS survey has been implemented annually in all 50 states, the District of Columbia, and Puerto Rico since fall 2000, with the U.S. Virgin Islands added in 2003.

The MFSS project team worked extensively with CMS and the MA project team during the first 7 months of 2004 to coordinate and discuss changes to the questionnaires that would be used in the 2004 Medicare CAHPS surveys. As a result of those discussions, CMS and the project teams made a number of changes to the 2004 surveys. The most significant changes were the deletion of six questions that had been included in the questionnaire in prior survey years and the addition of some new questions about prescription drugs and health promotion advice.

We present details of the changes made to the 2004 MFSS questionnaire (included in *Appendix A*) in Section 2 of this report.

Section 3: Sample Selection, Weighting, and Data Presentation

For the 2004 MFSS survey, the MFSS project team selected a sample of 178,650 fee-for-service Medicare beneficiaries from a sampling frame constructed from the July 2004 version of

CMS' Enrollment Database (EDB). The frame comprised almost 32.5 million persons who were continuously enrolled in fee-for-service Medicare for at least 6 months, did not have a representative payee, were over 18 years of age, and resided in any of the 50 states, the District of Columbia, Puerto Rico, or the Virgin Islands.

Prior to sample selection, we constructed local geographic areas (geounits), with each local area consisting of one or more counties. Factors considered for grouping counties included geographic contiguity, Medicare Advantage contract areas, and metropolitan statistical area (MSA) and state boundaries. County samples were then aggregated into geographic areas approximating fee-for-service market areas. In the 2000 MFFS survey, the selection allocation was defined to be 600 beneficiaries from each of the 275 geounits in the United States and 3,000 beneficiaries from Puerto Rico, for a total sample size of 168,000 beneficiaries in 276 geounits. Subsequent survey years involved additional sample and/or reallocations of sample but adhered to the goals of the original design.

For the 2001 MFFS survey, the total sample size was increased to 177,950 beneficiaries in 276 geounits. For the 2002 survey, no change was made to the number of geounits or to the total (national) MFFS sample size from the 2001 survey. However, we reallocated the sample for the 2002 survey to provide better power for estimates in counties that experienced significant changes in MA enrollment and/or counties with insufficient sample owing to higher than expected nonresponse in the prior MFFS survey. For the 2003 MFFS survey, we added one geounit for the Virgin Islands, bringing the total number of geounits in our study design to 277 and our total sample size to 178,650. In addition, we reallocated the sample for the 2003 survey, based on responses from the previous year. For the 2004 survey, we retained the number of geounits and the total (national) MFFS sample size from the 2003 survey. However, we reallocated sample in 2004 so that selected counties in five "donor" states contributed a proportionate amount of their allocated sample in excess of 330 completes from the previous year to recipient counties in Idaho and Kentucky. The states selected as donors of sample were those with the most effective sample size when compared with MA.

We stratified the MFFS population by county and selected a simple random sample from within each county. We then assigned an initial sampling weight to each selected beneficiary as the inverse of the selection probability, reflecting the differential selection rates used to identify beneficiaries from each county. To reduce the potential biasing effects of differential nonresponse, we post-stratified the initial sampling weights of respondents to sum to 337 separate counts of MFFS beneficiaries obtained from the October 2003 version of the EDB, which is the approximate midpoint of data collection. The counts included 277 totals for each of the local geounits in the United States, Puerto Rico, and the Virgin Islands, as well as 60 totals formed by the intersection of the age, gender, race, and dual Medicare/Medicaid eligibility factors.

Using responses from the 2004 survey, we evaluated the effect of the MFFS analysis weights on the accuracy of the survey estimates by comparing the mean square errors (MSEs) of weighted estimates to the corresponding MSEs of unweighted estimates. The MSE, defined as the sum of the bias squared and the variance, is used to measure the combined effect of bias and variance on the survey estimates. We assumed that the weighted estimates represent unbiased estimates because of the bias reduction and improved coverage that the weights offer. We

estimated the bias associated with the unweighted estimates as the deviation from the corresponding weighted estimate. We used the CAHPS macro with case-mix adjustment (CMA) to generate both the weighted and unweighted state-level estimates of two CAHPS ratings (Rate Medicare and Rate Health Care) and three CAHPS composites (Needed Care, Care Quickly, and Good Communication).

The results indicate that the weights are ignorable for many state estimates, especially those for the Good Communication composite. However, the weights are nonignorable for a number of state estimates of the overall ratings of Medicare and health care and the Needed Care and Care Quickly composites. Because all of the root MSEs (square root of the MSE) for the weighted estimates are either equal to or lower than those for the unweighted estimates, we conclude that the weighted analysis of the CAHPS MFFS survey data can improve the accuracy of state-specific estimates of CAHPS outcomes without adversely affecting the associated statistical power.

For the 2004 MFFS survey, we constructed a three-category disability variable based on the ADL survey question with the following categories: “Severe ADL Limitations,” “Mild ADL Limitations,” and “No ADL Limitations.”

Finally, we continue to maintain the MFFS trend data file, which combines the survey results from all 5 years of the MFFS survey (2000 through 2004). Because there are some differences in the survey instruments used during this time period, we created a crosswalk of survey questions. Users of the trend file should be aware of the differences in the survey instruments across the 5 years. These differences might lead to statistically significant trends that may, in fact, be artifacts of the question differences. The trend file assumes that the samples from each of the survey years are independent of each other and, hence, can be combined as one sample.

We present details of the sample selection, weighting, and data presentation activities for the 2004 MFFS survey in Section 3.

Section 4: Data Collection

The 2004 implementation of the MFFS survey was its fifth round. The MFFS survey is a self-administered mail survey with telephone follow-up of nonrespondents that also offers sample members the option of calling a toll-free number to complete the survey over the telephone. The biggest change in the 2004 implementation was that we increased the number of call attempts allowed to any sample member from 12 to 16 attempts. This change was based on the results of research conducted to learn the optimal number of calls for this population. In general, during telephone surveys we find that returns diminish after 6 call attempts. However, with the MFFS population there is no drop in response up to 16 call attempts. This finding was presented in a paper titled “The Costs and Benefits of Improving Response Rates of the CAHPS[®] Medicare Fee-for-Service Survey,” which was published in the proceedings of the *Joint Statistical Meetings of the American Statistical Association* (Campbell et al., 2004).

The data collection period for the 2004 MFFS started with the mailout of the prenotification letter on September 8, 2004, and ended with the close of the telephone follow-up on February 7, 2005. The response rate achieved for the 2004 MFFS was lower than that for the

2003 MFSS. The response rate among eligible sample members was 66.9 percent for the 2004 MFSS, which is 2.4 percent lower than the 2003 MFSS response rate of 69.3 percent. We also noted a decrease in the number of beneficiaries who completed the survey in Spanish. In 2004, only 1,154 surveys were completed in Spanish, and only 49 percent of those were completed by beneficiaries living in Puerto Rico. In 2003, there was a peak in the completion of surveys in Spanish, with 3,104 such surveys completed.

We present details of the data collection activities for the 2004 MFSS survey in Section 4.

Section 5: Using the Minimum Data Set (MDS) to Identify the Institutionalized in the Medicare Fee-for-Service Population

The Long-Term-Care Minimum Data Set (MDS) is a standardized, primary screening and health status assessment tool that forms the foundation of the comprehensive assessment for all residents of long-term care facilities certified to participate in Medicare or Medicaid. The MDS contains items that measure physical, psychological, and psychosocial functioning and provides a multidimensional view of the patient's functional capacities. MDS data from CMS are available starting in June 1998, although CMS does not recommend using MDS data until October 1998.

We acquired an extract of the November 1, 2003, MDS for institutionalized CAHPS MFSS sample members selected for the 2000, 2001, and 2002 surveys. We created a "finder" file of the 2000 through 2002 MFSS sample members, which included information about each MFSS sample member that could be used to obtain the MDS assessments (if any) for that member. The health insurance claim (HIC) number was used to uniquely identify each member. The finder file was matched with the MDS, and assessments were extracted for all sample members found to have records in the MDS to create an assessment-level file.

A stay-level data set was created from the assessment-level data set by creating one record for all assessments done during one stay. A person-level data set was then created from the stay-level data set by aggregating the stays for one person into one record. The institutionalized status variable, *mdsinst*, was created by examining each person's stays and creating an aggregated variable. Analyses of the MFSS data using the *mdsinst* variable were performed with the person-level data set.

We present details of our analyses using this constructed variable in Section 5.

Section 6: Case-Mix Adjustment

The CAHPS MFSS survey is centered around two types of comparisons: (1) beneficiary comparisons of MFSS and MA (formerly Medicare Managed Care) within local areas and (2) administrative comparisons of MFSS across local areas. Case-mix adjustment (CMA) is a central element in these comparisons. From ratings and reports of care, CMA attempts to remove response patterns that are systematically associated with such patient-level characteristics as demographics, socioeconomic status (education and Medicaid dual eligibility), and general health status, which may vary considerably across reporting units. These systematic patterns of association may reflect "response bias"—response patterns that do not correspond to actual

differences in quality of care. In any event, these are patient characteristics that are generally agreed to be beyond the control of providers or plans once they have been selected by beneficiaries. The goal of CMA can therefore be thought of as follows: to estimate the ratings and reports that a plan or collection of MFFS providers would have received if all providers and plans treated the same standardized population of patients (Medicare beneficiaries). This adjustment should make attributions of ratings and reports to MFFS providers and MA plans more appropriate, supporting better decision making by beneficiaries and quality improvement by CMS and Quality Improvement Organizations (QIOs).

The two goals of MFFS CMA (within-MFFS comparison and MFFS-vs.-MA comparison) suggest similar, but slightly different, CMA models. *Table ES.1* describes the independent variables recommended for case-mix adjustment for both models.

Table ES.1
Description of independent variables used in MFFS case-mix adjustment (2004)

Variable	Response options
Age	<44, 45-64, 65-69, 70-74, 75-79, 80-85, >85
Education	<8th grade, some high school, high school graduate or GED, some college (but less than 4-year degree), 4-year college graduate, >college graduate (some graduate school beyond the 4-year degree)
General health perception	Excellent, very good, good, fair, poor
Mental health perception	Excellent, very good, good, fair, poor
Proxy respondent status	No assistance on survey, someone helped but did not answer for you, someone answered for you
Dual-eligibility indicator (eligible for Medicaid program)	Yes, no

The present study found that the case-mix adjusters employed in 2001 through 2003 MFFS-vs.-MA CMA (age, education, self-rated health status, self-rated mental health status, and proxy respondent status¹) constitute an effective case-mix model for both comparison purposes. Self-rated health, self-rated mental health, and education were the three most important CMA variables. An indicator of dual eligibility, long used in the within-MFFS model, is a useful addition to the MFFS-vs.-MA model, given the new inclusion of the dually eligible in these comparisons. These findings are consistent with CMA results for 2000 through 2003.

¹ While proxy respondent status has only a small empirical effect on CMA, it has been included because many stakeholders feel it is important for the face validity of CMA.

Within-MFFS CMA employs the above independent variables plus dummies corresponding to the geographic units being compared (county-based sampling stratum, state, or CMS region) in a linear regression. In these regressions, CAHPS ratings in reports serve as dependent variables, sometimes in their original forms, sometimes dichotomized to correspond to displays of data to consumers. Although age is very important for adjusting the rating of Medicare, the most important CMA variables for within-MFFS CMA in 2002 through 2004 were education and self-rated mental health.

In MFFS-vs.-MA CMA, these same variables from *Table ES.1* also serve as independent variables in a linear regression, but dummies correspond to MA plans, with MFFS treated as an additional “plan.” While the direction of CMA coefficients is similar for MFFS and MA, the magnitudes of the effects sometimes differ. In 2000 and 2001, the well-established tendency of healthier beneficiaries to rate their care more positively or to report better health care experiences was considerably stronger in MA than in MFFS, with MA slopes generally 50 to 100 percent larger than MFFS slopes for the general self-rated health item for most subjective global ratings and many objective report items. In other words, ratings and reports of one’s health care were considerably more sensitive to one’s (general) health status in MA than in MFFS. In 2002 through 2004, this pattern was largely restricted to the global ratings. If this is a reliable trend, and if one considers the report items to be more objective, one possible interpretation of these findings would be that health-status-based differences in MFFS and MA experiences may be diminishing, though not the perceptions of those differences. Interestingly, the self-rated mental health item did not follow this pattern; mentally healthier beneficiaries reported more positively than less mentally healthy beneficiaries to the same extent in MFFS and MA, 2000 through 2004. In the case of the global rating of Medicare or Medicare Advantage plan, the tendency of the dually eligible to be especially positive about Medicare was stronger than the tendency of the dually eligible to be especially positive about MA. For three report items within the Needed Care composite and three report items within the Care Quickly composite, the dually eligible provided less favorable reports than others within MFFS, whereas within MA dually eligible differed little or not at all from other beneficiaries.

A major implication of the difference in general health status coefficients is that the difference between the case-mix adjusted mean of an MA plan and an MFFS reporting entity depends on the reference population. Case-mix adjustment to a healthy reference population would be relatively more favorable to MA, and case-mix adjustment to an unhealthy reference population would be relatively more favorable to MFFS. In 2000 through 2004 Medicare Compare consumer materials, MFFS-vs.-MA CMA used the midpoint of MFFS beneficiary and MA beneficiary characteristics as the reference population. Because of the generally poorer health status of MFFS beneficiaries (even excluding the dually eligible), the general health perception (GHP) component of CMA tends to adjust in favor of MFFS relative to MA.

In comparing MFFS and MA, there was concern that underlying geographic factors not captured in a case-mix model might inappropriately influence MFFS-vs.-MA comparisons. To ensure geographic equivalence of state-level comparisons, county-based “geographic

equivalence weights” (GEW) were created in the states¹ where MA exists. These weights were then combined with MFFS nonresponse weights.

Comparison weights have gone from moderate adjustments in favor of MA in 2001 to very small adjustments in 2002 through 2004. One interpretation is that MFFS sample was initially scarce in the geographic regions that had the least positive Medicare experiences among those regions with MA penetration. The shrinking effect of the comparison weights may be attributable to the reallocation of MFFS sample into the counties with high MA penetration but low population that were initially unrepresentative, in the efforts to reduce the design effect of the comparison weights. In other words, the geographic distribution of the MFFS sample is much better matched to MA in 2004 than it was in 2001.

The impact of case-mix adjustment on within-MFFS comparisons has remained moderate. The adjustments for the most affected states are quite substantial for both between-state comparisons of MFFS and within-state comparisons of MFFS with MA. Nationally, case-mix adjustment has gone from moderate adjustments in favor of MA in 2001 to small adjustments in favor of MA in 2002 to moderate adjustments in favor of MFFS in 2003 and 2004. A similar pattern exists for case-mix adjustment of state-level comparisons of MA and MFFS, except that the amount of adjustment of these estimates by CMA has increased notably in 2002 through 2004.

Adjustments favoring MA probably correspond to MA having a higher proportion of certain types of negative responders: the young and the better educated. Adjustments favoring MFFS probably correspond to MFFS having a higher proportion of a different class of negative responders: the unhealthy. The shift from adjustments favoring MA to adjustments favoring MFFS could mean that age and education selection into MA is becoming weaker or is being dominated by stronger selection on the basis of health. Future research should investigate trends in MFFS-vs.-MA case-mix demographics.

We present details of our case-mix adjustment activities in Section 6.

Section 7: Beneficiary Health Status and Health Care Experiences: Differences Between Medicare Advantage and Fee-for-Service, 2000-2003

Section 6 (Case-Mix Adjustment) notes persistent differences between MFFS and MA in the tendency for healthier beneficiaries to report more positive experiences. While this tendency exists within both systems, it has generally been stronger for MA than for MFFS.

This pattern suggests the possibility that differences between MFFS and MA beneficiary experiences might differ by beneficiary health status. If this were the case, beneficiaries might want to consider their own health status when comparing MFFS and MA, and reporting that clarified such distinctions might prove useful.

To address this question, we made national comparisons between MFFS and MA on outcomes from the 2000 through 2003 CAHPS Medicare surveys within subgroups defined by

¹ Including the District of Columbia and Puerto Rico.

self-rated beneficiary health status. Within each combination of year and health status category, we compared MFFS and MA nationally for each of a series of CAHPS survey outcomes. To ensure that annual comparisons reflected actual change within the same geographic regions, rather than changes in managed care penetration, we restricted comparisons to a common set of counties that had both MFFS and MA beneficiaries in each of the 4 years.

Sample

The geographic area used for this study consisted of the 617 counties within 40 states where beneficiaries had a choice between MFFS and MA in each of the 4 years, 2000 through 2003. This area included more than 90 percent of MA beneficiaries and about half of all MFFS beneficiaries in any given year. The total corresponding sample sizes were 610,231 MA and 220,584 MFFS beneficiaries. No CMS region contributes more than 19 percent of the sample for MFFS or MA.

Variables

Six outcomes reported on the Medicare Compare web site were used as outcomes. They included all three report composites (Care Quickly, Needed Care, Good Communication) and one global rating (Care Received). Also included were two reported measures of immunization (Flu, Pneumonia).

Beneficiaries were classified into three categories of self-rated health: “Excellent or very good,” “Good,” and “Fair or poor.” Education, age, proxy respondent status, and county of residence were employed as categorical case-mix adjusters.

Models

A total of 72 linear regressions were performed, one for each factorial combination of the six outcomes, 4 years, and three self-reported health status categories. These models were performed using the CAHPS macro, adjusting for education, age, proxy response status, and exact county of residence. This is equivalent to a linear regression with the CMA variables and an MFFS indicator predicting each outcome. We examined the coefficients associated with the MFFS indicator and their statistical significance at the .05 level of statistical significance.

Results

Overall Levels—One overall pattern that emerged was that performance was consistently high. The mean global rating of care received ranged from 84 percent to 92 percent of its maximum possible value, with more positive experiences for those in better health. The mean composite score ranged from 71 percent to 95 percent of its maximum possible value, with more positive experiences for those in better health. Immunization rates ranged from 57 percent to 78 percent, with lower rates for those in better health. This result probably reflects a perception of the severity of the need, even though these immunizations are indicated for all beneficiaries.

Direction and Significance of Differences—A clear split is apparent between the immunization outcomes on the one hand and the beneficiary ratings and reports on the other. In

the case of immunization, all 24 cells favor MA. MA has consistently provided higher rates of both immunizations to beneficiaries of all health statuses.

For the other four outcomes, 35 of 38 comparisons favored MFFS, only 2 favored MA, and 11 did not differ at $p < .05$. The advantage of MFFS was most consistent for those in fair or poor health, where MFFS was rated higher in 14 of 16 comparisons and MA was rated higher in none. The outcome that most consistently favored MFFS was Care Quickly (significantly better in 10 comparisons of 12).

It also appears that the consistency of the MFFS advantage on these items increased from 2000 to 2003. In 2000, 5 comparisons of 12 favored MFFS and 2 favored MA. In 2001 and 2002, 18 of 24 favored MFFS. By 2003, all 12 favored MFFS.

Size of Differences—Immunization rates for MA are 4 to 7 percent higher than MFFS for flu and 5 to 10 percent higher than MFFS for pneumonia. The differences are greatest for those in fair or poor health. The advantage of MFFS over MA for the composites and the global rating is generally small (0.03 to 0.20 standard deviations averaging across health status; greater than 0.2 standard deviations for three of four measures for beneficiaries in fair to poor health).

We present details of these comparisons in Section 7.

Section 8: Subgroup Analyses

During the past 5 years, the Medicare CAHPS implementation project has provided CMS with data that have been used to help beneficiaries decide among health plan options. Data collected through the CAHPS MFFS and MA surveys have enabled beneficiaries residing in areas in which there is a choice of plans (managed care or fee-for-service) to access data comparing CAHPS measures for these plan types.

In addition to providing data for comparison among plan options, RTI has conducted analyses of the data to examine experience and satisfaction with health care services by subgroups of Medicare beneficiaries. Analyses of Medicare subgroups are conducted to gain a better understanding of the differences in health services experience and satisfaction among Medicare beneficiaries by geographic levels (national, regional, and state level), sociodemographic characteristics, health plan options, and health status. The MFFS population is quite heterogeneous in terms of demographic characteristics, region of residence, presence of supplemental insurance (whether with or without prescription drug coverage or Medicaid), and health-related characteristics. These subgroups of MFFS beneficiaries have vastly different experiences with and expectations of the health care system and, thus, may perceive the quality of and access to services differently.

In Section 8, we provide results of analyses of data from the 2004 CAHPS MFFS survey. (The complete survey instrument is provided in *Appendix A*.) The analyses presented examine differences across selected subgroups for the most-positive CAHPS ratings and reports (i.e., “10,” “Always,” “Not a problem,” or “Yes”). Nine performance indicators (five composite indicators based on reports and four rating indicators) were used from the survey:

- Needed Care Composite
- Good Communication Composite
- Care Quickly Composite
- Respectful Treatment Composite
- Medicare Customer Service Composite
- Rate Personal Doctor
- Rate Specialist
- Rate Health Care
- Rate Medicare

Key Findings

Key findings are summarized in two ways. First, we describe a 5-year trend (2000 through 2004), and then we provide specific highlights from the 2004 findings.

Trends From 2000 Through 2004—During the 5-year period (2000 through 2004), between 84 and 89 percent of MFBS beneficiaries reported that they always received needed care. Although there was a drop from 89 percent in 2001 to 84 percent in 2002, the proportion of beneficiaries reporting that they always received needed care remains quite high (86 percent in 2004). However, the proportion of beneficiaries who reported always getting care quickly during the 5-year period was lower—about three out of five beneficiaries (58 percent) reported no problems getting care quickly in 2004. There were no changes for the Care Quickly composite from 2003 to 2004 (58 percent), but the small differences in results for that composite between the 2003, 2002, 2001, and 2000 surveys may be due to changes in the wording of questions that make up this composite indicator.

Most-positive responses for the Respectful Treatment composite remained fairly constant over the 5-year period. Throughout the period, approximately four out of five beneficiaries (79 to 80 percent) reported optimal experiences with being treated respectfully by providers and their staff. However, less than two-thirds of beneficiaries provided most-positive responses to the Good Communication composite.

Of the composites, the Medicare Customer Service composite saw the largest drop overall and over any 2-year period (from 2003 to 2004). In 2004, 56 percent of beneficiaries reported most-positive experiences with Medicare customer service, a 6-percentage-point drop from the 62 percent reported in 2003. This decrease in most-positive responses for the Medicare Customer Service composite appears to be driven by increases in reports of problems for all three of the CAHPS questions that comprise the Customer Service composite. Beneficiaries responding to questions about customer service are those who made some attempt to seek

information about Medicare. During the same period, we observed an increase in the percentage of beneficiaries seeking information, from 13 percent in 2003 to 18 percent in 2004.

Approximately half of beneficiaries rated their health care, specialist, and personal doctor a “10” during the 5-year survey period. However, ratings of the Medicare health plan were lower overall and decreased substantially over the 5-year period. During the first 3 years of the reporting period, there was a gradual downward trend in best possible ratings of Medicare—47 percent in 2000, 46 percent in 2001, and 44 percent in 2002. The most noteworthy change in the ratings over the survey period was a 6-percentage-point decrease in the proportion of beneficiaries rating the Medicare health plan a “10”—from 44 percent in 2002 to 38 percent in 2003. The sharp downward trend slowed for 2004, with a slight decrease to 36 percent. This trend occurred despite no change in ratings of physicians, specialists, or overall health care during the period.

Patient experiences with getting care quickly and good communication were very similar for the MFFS and MA beneficiary populations. By contrast, a higher percentage of MFFS beneficiaries provided most-positive responses to the Needed Care composite during the 5 years, compared with their peers enrolled in MA. MFFS beneficiaries were also slightly more likely to provide the best ratings for their health care and the Medicare health plan compared with MA beneficiaries.

Sociodemographic Characteristics

2004 Highlights—For most CAHPS composites and ratings, beneficiaries between 18 and 45 years of age were less likely to provide most-positive responses than all other age groups. For the Needed Care and Respectful Treatment composites and ratings of the Medicare plan and overall health care in 2004, there was at least a 12-percentage-point difference between the proportion of most-positive responses reported by beneficiaries 80 years of age or older and those in the youngest age group, 18 to 45 years of age. For the Medicare plan rating, there was a 25-percentage-point difference for most-positive responses between the oldest age group and youngest age group—48 percent for beneficiaries 80 years of age or older versus 23 percent for beneficiaries 18 to 45 years of age. There is a general trend with age, and these age differences may reflect response tendencies, rather than better care for older beneficiaries.

Black (African American) beneficiaries were generally more likely than White beneficiaries or beneficiaries of other races to provide most-positive responses to CAHPS indicators in 2004. There was little to no difference between Whites and Blacks for most-positive responses to the CAHPS composites, with the exception of the Good Communication composite—72 percent of Black beneficiaries provided most-positive responses regarding their communication with providers, compared with only 66 percent of White beneficiaries. However, other races provided a lower percentage of most-positive responses for composites compared with both Whites and Blacks.

CAHPS composite results among Hispanic beneficiaries versus non-Hispanic beneficiaries were mixed. Hispanic beneficiaries provided a higher percentage of most-positive responses than non-Hispanic beneficiaries for the Good Communication and Medicare Customer Service composites, but a lower percentage of most-positive responses for the remaining

composites. For all the ratings, Hispanic beneficiaries were more likely than non-Hispanic beneficiaries to provide most-positive responses.

There was generally an inverse relationship between education and CAHPS ratings and composites. As education level increased among beneficiaries, the percentage of most-positive responses decreased. Although this was generally true for the composites, this relationship was more pronounced for the ratings.

Findings From 2000 Through 2004—A similar proportion of male and female MFFS beneficiaries provided most-positive responses to the CAHPS composite indicators, whereas 3 to 5 percent more women provided best possible responses to three of the four CAHPS ratings during the 5-year period. There was a consistent age effect, with younger beneficiaries less likely to report most-positive experiences than older beneficiaries during all 5 years. CAHPS indicator scores similarly varied by education during the 5-year period; less educated beneficiaries were consistently more likely to report most-positive experiences than more educated beneficiaries. Blacks were generally more likely to report most-positive ratings of satisfaction with care compared with Whites and beneficiaries of other races; however, their responses to composites, reflecting experiences with care, were similar to those of Whites. In general, beneficiaries of other races were less likely than White or Black beneficiaries to provide most-positive responses to all questions. Hispanics rated Medicare and their overall health care slightly higher than did non-Hispanics, but there was generally little to no difference in their composite scores during the 5-year period.

Health Status

2004 Highlights—For all indicators, excellent physical and mental health is associated with most-positive responses as compared with respondents in poor physical and mental health. For example, in 2004, there was a 14- to 15-percentage-point difference between the proportion of the healthiest beneficiaries and sickest beneficiaries providing most-positive responses for the Good Communication composite.

The self-report of a chronic illness had little association with composites and ratings. The only notable exception was for the Medicare plan rating, where a smaller percentage of beneficiaries with a chronic illness provided a “10” rating compared with beneficiaries who did not report having a chronic illness (36 percent vs. 42 percent).

Beneficiaries who had been hospitalized overnight at least once during the year prior to the survey were slightly more likely to rate their specialists a “10”; however, hospitalization during the prior year had little effect on other CAHPS scores during the 5 years. In 2004, disability seemed to have no effect on the CAHPS composites, with the exception of Medicare Customer Service—a smaller percentage of disabled beneficiaries gave most-positive responses than did nondisabled beneficiaries. Disabled beneficiaries gave a slightly higher percentage of “10” ratings for personal doctor and specialist; however, disability seemed to have no measurable effect on the health care or Medicare plan ratings. (See more below on disability status.)

Findings From 2000 Through 2004—During the 5 years and across all indicators, there was a strong and consistent association between health status and CAHPS scores; beneficiaries

reporting better physical and mental health status were more likely to provide most-positive responses for each CAHPS indicator.

Access to Care

2004 Highlights—Beneficiaries who were dually eligible for Medicare and Medicaid gave higher ratings than those who reported having additional insurance and prescription drug coverage; this was the case for all ratings in 2004. Dually eligible beneficiaries had the same health care experiences as beneficiaries with additional insurance and prescription drug coverage for several indicators. Two notable exceptions include the Needed Care composite, for which dually eligible beneficiaries provided a lower percentage of most-positive responses than beneficiaries with additional insurance and prescription drug coverage, and Medicare ratings.

Beneficiaries who reported having a personal doctor were generally more likely to provide most-positive responses, particularly for the composites and the ratings of health care and specialist in 2004.

Findings From 2000 Through 2004—During each of the 5 years, beneficiaries dually eligible for Medicare and Medicaid were more likely to rate their personal doctor, specialist, health care, and Medicare a “10” compared with those who had supplemental health insurance, with or without coverage for prescription drugs. Beneficiaries with supplemental health insurance were most likely to report always getting needed care over the 5 years, whereas dually eligible beneficiaries were most likely to report most-positive responses to the Good Communication composite. Beneficiary experiences with getting care quickly and respectful treatment did not vary by insurance coverage over the 5-year period. The relationship between insurance coverage and customer service was inconsistent during the period. There were no differences by insurance during 2000 and 2001. In 2002 and 2003, dually eligible beneficiaries were most likely to provide most-positive responses to the Customer Service composite, and in 2004 beneficiaries with additional insurance including coverage for prescription drugs and dually eligible beneficiaries were most likely to rate their experience with Medicare customer service highly.

Year 2004 Analyses

For 2004, we conducted two additional analyses. We examined the relationship between CAHPS scores and disability, and we assessed beneficiary experiences accessing prescription medicines.

Supplemental Analysis: Relationship Between CAHPS Scores and Disability—The purpose of this analysis is to examine patterns of reported experience with health care services among a population of activities of daily living (ADL)-disabled MFFS beneficiaries. We constructed a three-category disability variable based on the ADL survey question. The survey question used to create the ADL disability variable asked if the respondent had difficulty or was unable to perform the following ADLs due to a health or physical condition: (1) bathing, (2) dressing, (3) eating, (4) getting in or out of chairs, (5) walking, and (6) using the toilet. Three categories for the disability variable are as follows:

- No ADL limitations—Respondents reporting no difficulties for any of the ADLs.
- Mild ADL limitations—Beneficiaries having difficulty with one or two ADLs.
- Severe ADL limitations—Respondents reporting that they were unable to perform any of the ADLs or had difficulty performing three or more of the ADLs.

In general, as disability increased the percentage of beneficiaries reporting problems with health care increased, as reflected in the CAHPS composites and responses to survey questions about access to prescription drugs. For the Customer Service composite and Problem Getting Prescriptions measure, beneficiaries with severe ADL limitations have more problems than beneficiaries with no ADL limitations. Beneficiaries with severe ADLs and \$200 or more in average monthly prescription drug costs report the most problems with getting prescriptions and customer service. These results reflect findings from a growing body of literature that suggests persons with disabilities have different experiences with their health care than persons without activity limitations. Among MFFS beneficiaries, those with ADL limitations report greater problems accessing needed prescription medications and needed care, greater problems with customer service, and more delays getting prescription medications because of cost. Beneficiaries with disabilities were more likely to report that they are worried about being able to afford needed prescription medication over the next year.

Supplemental Analysis: Medicare Beneficiary Experiences of Accessing Prescription Drugs—This supplemental analysis presents findings from the 2004 CAHPS MFFS and MA surveys to provide a detailed view of beneficiary experiences and attitudes related to prescription drug access. Overall, the vast majority of Medicare beneficiaries (83 percent) reported needing prescription drugs, almost three-quarters of whom reported getting three or more different prescriptions during the past 6 months. Sixty percent of beneficiaries reported paying between \$1 and \$100 for prescriptions each month. An additional 28 percent reported spending between \$101 and \$300 each month, and 7 percent reported spending more than \$300 per month for prescription medicine. The remaining under 5 percent of beneficiaries reported spending nothing on prescription medicines despite reporting that they had obtained some prescriptions in the past 6 months. In general, a small percentage of beneficiaries reported problems getting needed medications (14 percent) or delay getting a prescription medicine because of affordability (15 percent). By contrast, 58 percent of beneficiaries reported being at least a little worried about being able to afford prescription medicines that they would need over the next year.

The results of the logistic regression models showed that controlling for a variety of sociodemographic and health status variables, insurance type and prescription drug coverage were significantly related to beneficiary reports of problems accessing needed prescription medicines, delays in obtaining medicines due to cost, and worry about the affordability of prescription drugs over the next year. Compared to MA enrollees with prescription drug coverage, MFFS beneficiaries were less likely to report problems, delays, or worry about prescription drugs. Similarly, MFFS beneficiaries with additional insurance that did not cover prescription drugs were also less likely to report problems and delays than MA enrollees with prescription drug coverage. MA enrollees and MFFS beneficiaries with no additional insurance were significantly more likely to report problems, delays, and at least a little worry about the

affordability of their drugs during the next year compared with MA enrollees who had coverage for prescription medicines.

We present details of the subgroup analyses for the 2004 MFFS survey in Section 8.

Section 9: 2004 MFFS Reasons Followback Pilot Survey

As part of the 2004 CAHPS MFFS survey, RTI implemented the Reasons Followback (RFB) Pilot Survey with a subsample of respondents to the main survey who reported that they had a “big problem” getting care in one or more of the following access areas:

- Finding a personal doctor or nurse you are happy with
- Seeing a specialist
- Getting care you or your doctor believed was necessary
- Getting prescription medicines

There were two main objectives for conducting the RFB pilot survey. The first was to gain a better understanding of the reasons why Medicare beneficiaries who participated in the 2004 MFFS survey had problems with access to care. The second objective was to determine whether re-asking the question “How much of a problem, if any, was it to...” in the RFB interview would yield more consistent data (based on respondent recall) than asking only applicable RFB survey questions related to problems with access to care.

Although one of the objectives of the RFB was to learn more about Medicare beneficiaries’ experience with access to care, the RFB pilot survey is considered a qualitative survey in that it was not designed to yield meaningful, or representative, estimates on a national or state basis. In addition, we collected data using a structured set of survey items; however, telephone interviewers recorded the responses for some key items in open-ended text fields if the respondents’ answer to an item did not clearly fit one of the preprinted answer choices.

The RFB pilot survey included a random sample of 1,000 respondents to the main 2004 CAHPS MFFS sample in 11 states who met specific eligibility criteria—that is, they reported that they had a “big problem” getting care in one or more of the designated access areas and they gave their consent in the main survey to be recontacted. We identified and selected the 10 states with the largest number of respondents citing a big problem in one or more of the four access areas by generating and examining unweighted response frequencies from the 2004 main survey. After discussions with CMS about the distribution of access problems reported in the main survey, we selected respondents from the following 10 states: California, Florida, Georgia, Michigan, North Carolina, New York, Ohio, Pennsylvania, Texas, and Virginia. We also included a subsample of respondents from the state of Missouri as requested by CMS.

The RFB pilot survey was conducted from November 19, 2004, through March 6, 2005, via a telephone survey using computer-assisted telephone interviewing (CATI). To determine whether re-asking the problem question would yield better data, we conducted an experiment to test two different sets of questions in the RFB. One-half of the sample was administered a set of

questions in which the “problem” question from the main survey was re-asked for all four access areas, regardless of how the respondent answered that question for each access item in the main survey. If the sample member reported in the RFB interview that an access area was a big problem, an applicable series of questions about the problem with that access area was then asked. For the other half of the RFB sample, referred to as the Version B sample, we did not re-ask the problem question. Version B sample members were only asked applicable RFB questions about the access area(s) they reported as a big problem in the main survey.

Data collection efforts resulted in obtaining a completed RFB interview with 762 sample members, for an overall response rate of 76.2 percent. The response rate was 78.6 percent for the Version A sample and 73.9 percent for the Version B sample. The response rates from respondents in the 11 states varied, ranging from a low of 68.3 percent to 88.1 percent. Selected findings for reasons for problems getting care in the targeted access areas are provided below.

Problems Finding a Personal Doctor or Nurse

The series of questions about problems finding a personal doctor or nurse was administered to 167 respondents. Respondents cited 40 different reasons for problems finding a personal doctor or nurse they could be happy with. The top five reasons cited were as follows:

1. Could not find doctor accepting Medicare at all (10.8 percent)
2. There were few doctors in my area (9.6 percent)
3. Dissatisfied with care/doctor did not give care/services/prescribe medicines needed or wanted (9.0 percent)
4. Doctor did not listen/communicate well/spend enough time/explain things so I could understand (8.4 percent)
5. Could not find doctor taking new Medicare patients (7.8 percent)

Problems Seeing a Specialist

The series of questions about problems seeing a specialist that the sample member needed to see was administered to 175 respondents. Respondents cited 34 different reasons for not being able to see a specialist. Following are the top five reasons most frequently cited:

1. Could not find a doctor accepting Medicare at all (13.1 percent)
2. Found a doctor but could not get an appointment when needed or wanted (10.9 percent)
3. Could not get a good recommendation or referral (6.9 percent)
4. Could not afford what the doctor wanted to charge (6.3 percent)
5. Doctor did not provide good care/service/dissatisfied with care (5.7 percent)

Problems Getting Care Needed

The series of questions about problems getting care, tests, and treatment was administered to 143 respondents. Respondents cited a total of 32 different reasons for not being able to get the care they or a doctor believed they needed. The top five reasons most frequently cited included the following:

1. Could not afford the charges (15.4 percent)
2. Doctor did not provide good care/service/dissatisfied with care (9.8 percent)
3. Could not get a recommendation or referral (6.3 percent)
4. Unspecified problems with the doctor (4.9 percent)
5. Place I needed to go was not accepting Medicare (4.9 percent)

Problems Getting Prescription Medicines

Of the 342 respondents who reported in the RFB interview that getting prescription medicines was a big problem, the majority (31 percent) had a problem getting five or more prescription medicines. Respondents cited 25 different reasons for not being able to get the prescription medicines they needed. The top five reasons most frequently cited were as follows:

1. Cost too much/could not afford (67.5 percent)
2. Insurance would not cover the cost (10.8 percent)
3. Problems getting prescription filled by mail (1.8 percent)
4. The pharmacy lost the prescription or other problem with the pharmacy (1.5 percent)
5. Could not get a prescription from the doctor (1.5 percent)

Thirty-seven (10.8 percent) respondents indicated that there was no consequence of not getting the medicines they needed. The other 89.2 percent gave 21 different consequences of not getting the prescription medicines they needed. The five consequences cited most frequently were the following:

1. The condition got worse (35.4 percent)
2. Eventually got medicine, no consequence specified (12.6 percent)
3. Could not afford the medicine, no consequence specified (9.1 percent)
4. Still do not feel well (8.2 percent)
5. Had to go to the emergency room (6.1 percent)

Results of the Version A/Version B Experiment

Our analysis of the data from the experiment that was conducted showed that we obtained more consistent data from interviews with respondents who participated in a Version B interview. However, even with that version, we found that the amount of time between participation in the main survey and the RFB interview affected the respondents' ability to answer the same way about the same incident at different points in time. Therefore, even though Version B interviews yielded fewer cases with inconsistent responses, we can expect to continue to experience this problem if future followback surveys on problems with access to care are fielded.

We present details of the RFB pilot survey activities in Section 9.

Section 10: Impact of Influenza Immunization on Seasonal Medical Expenditures Among Elderly Medicare Beneficiaries, 2000-2003

RTI conducted an analysis to examine the impact of influenza immunization on subsequent expenditures for inpatient, outpatient, and professional services among independent national samples of elderly Medicare beneficiaries during the four flu seasons between 1999-2000 and 2002-2003. (Some of these additional analyses were sponsored by the U.S. Department of Health and Human Services Office of Public Health Service.)

We surveyed independent samples of approximately 175,000 MFFS beneficiaries annually by mail and telephone as part of the CAHPS surveys. Response rates ranged from 64 percent to 71 percent. Survey data included beneficiaries' demographic characteristics, education, supplemental insurance status, perceived health status, and whether they had a flu shot between September and December of the previous year. Baseline measures derived from Medicare claims for beneficiaries during the year prior to the onset of the flu season included service utilization, comorbidities, and claims-based health status. The primary outcome was medical expenditures for the treatment of acute and chronic respiratory conditions. It was based on Medicare claims for the 33-week annual flu seasons.

The results show a reduction in total medical expenditures for acute and chronic respiratory conditions among those who received a flu shot during all four influenza seasons. However, the amount and statistical significance of the savings seem to depend on the severity of the virus and the match between the vaccine and the prevalent influenza strains: the greater the virulence and the closer the match, the larger the savings (see *Table ES.2*). The 1999-2000 flu season was the most severe, and the vaccine used that year was a relatively good match to the prevalent flu strains, leading to an average seasonally lower cost for services related to acute and chronic respiratory conditions of \$88 for persons receiving influenza immunization (3.06 percent lower average total spending). The 2002-2003 flu season was less severe but had the highest overall vaccine match rate, resulting in lower average seasonal costs for immunized beneficiaries of \$103 (3.12 percent lower average total expenditures). These lower total expenditures for beneficiaries receiving influenza vaccinations were accounted for entirely by lower use of inpatient services. Influenza vaccination, however, was associated with slightly greater use of outpatient and professional services.

The cost-effectiveness of influenza vaccinations appears to vary from season to season depending on the virulence of the virus and the match between the vaccine and the influenza strains. We found that when the flu season is severe or when the vaccine closely matches the prevalent strains of the season, vaccination of the elderly against influenza is likely to be cost-effective. Thus, in addition to improving the health of elderly Americans, striving to meet the *Healthy People 2010* influenza immunization goal of 90 percent immunization of the elderly may also result in a modest reduction in Medicare expenditures.

We present details of the influenza immunization study in Section 10.

Table ES.2
Impact of influenza vaccination on seasonal expenditures for acute or chronic respiratory conditions for Medicare-covered services

	1999-2000 (\$)	2000-2001 (\$)	2001-2002 (\$)	2002-2003 (\$)
All services	-88.29**	-23.90	-31.23	-103.48***
Inpatient services	-102.92***	-43.61*	-64.47**	-130.47***
Hospital outpatient services	1.37	1.76	7.64***	6.99***
Professional services	0.56	3.89***	7.02***	3.09***

NOTE: Figures derived from regression models. Expenditures measured over claims with primary or secondary diagnosis for acute or chronic respiratory conditions only. Expenditures based on services used during 33-week flu season as reported by the Centers for Disease Control and Prevention (CDC). Flu shot item nonrespondents with no claim for influenza vaccination were coded as nonvaccinated. Total expenditures include expenditures for home health and durable medical supplies. *** indicates significance at 1 percent level, ** at 5 percent level, and * at 10 percent level using two-tailed t-test.

SOURCE: RTI analysis of CAHPS MFFS and Medicare claims data, 1999-2004.

SECTION 1 INTRODUCTION

by Jeffrey S. Laufenberg, M.S., RTI

The Centers for Medicare & Medicaid Services (CMS) currently conducts three Consumer Assessment of Health Providers and Systems (CAHPS[®]) surveys of the Medicare population:

1. The Medicare CAHPS Fee-for-Service (MFFS) Survey: a survey of Medicare beneficiaries who are enrolled in Original Medicare (fee-for-service Medicare).
2. The Medicare Advantage (MA) CAHPS Survey (previously known as the Medicare CAHPS Managed Care [MMC] Survey): a survey of Medicare beneficiaries currently enrolled in a Medicare managed care plan.
3. The Medicare CAHPS Disenrollment Assessment Survey: a survey of Medicare beneficiaries who recently left or disenrolled from a Medicare Advantage plan.

The surveys collect information on an annual basis to fulfill a requirement of Congress (under the Balanced Budget Act of 1997) to provide information to Medicare beneficiaries on the quality of health services provided through the Original Medicare (MFFS) plan and to compare this information with similar information collected from beneficiaries enrolled in Medicare managed care (now MA) health plans. Information from all three surveys is used in the Medicare Personal Plan Finder web page that is available to Medicare beneficiaries on the Medicare web site (www.medicare.gov/MPPF/DefaultVersion/home.asp). The Personal Plan Finder is designed to help beneficiaries make more informed decisions when choosing a Medicare health plan.

The 2004 MA survey was the eighth implementation of what had previously been known as the MMC survey. The Disenrollment Assessment and MFFS surveys were conducted for the first time in fall 2000. The data from the MA and Disenrollment Assessment surveys are combined and analyzed together so that results for any given managed care plan reflect the experiences both of individuals who stayed in the plan and of those who voluntarily disenrolled during the 6 months preceding data collection. In fall 2000, CMS funded the national implementation of the MFFS survey, thereby providing the data to construct CAHPS ratings and composites for both the fee-for-service and managed care populations.

The 2000 through 2004 CAHPS MFFS surveys were conducted for CMS by RTI, with the assistance of RAND, Pearson NCS, and Discovery Research Group (DRG). The work was performed under subcontract to the Center for Health Systems Research and Analysis at the University of Wisconsin-Madison (UW), as part of UW's contract with CMS (Contract Number 500-95-0061).

This report provides a summary of the methodology and findings of the 2004 CAHPS MFFS survey as well as some trend analysis of the 2000 through 2004 survey results. More detailed information on the topics presented here is available in the individual reports developed for the 2004 survey. Similar reports are also available for the 2000 through 2003 CAHPS MFFS surveys.

SECTION 2 2004 MEDICARE CAHPS® FEE-FOR-SERVICE SURVEY QUESTIONNAIRE

by Judith T. Lynch, B.A., RTI

In the first half of 2004, as in each of the past 4 survey years, the project teams for the Medicare CAHPS® Fee-for-Service (MFFS) Survey and the Medicare Advantage (MA) CAHPS Survey worked closely together and with CMS to discuss potential changes to the questionnaires to be used in the 2004 surveys as a result of analytic, consumer reporting, or policy issues. Because extensive work had been conducted in prior survey years to make the two questionnaires as comparable as possible, the main focus of the review and changes to the questionnaires to be used in the 2004 surveys was on adding some questions related to prescription drugs and identifying questions as candidates for deletion to make room for the new questions. The changes made to the CAHPS MFFS questionnaire for the 2004 survey implementation are described in the following sections. A copy of the questionnaire is provided in *Appendix A*.

2.1 Questions Deleted for the 2004 MFFS Questionnaire

The most significant changes made to the questionnaire for the 2004 survey took place because of CMS' need for information about prescription drugs. Specifically, CMS was interested in adding questions to determine (1) whether beneficiaries delayed or did not get the prescription drugs they needed because they could not afford them; (2) out-of-pocket costs to beneficiaries for prescription drugs; and (3) the degree to which beneficiaries worry about their ability to get prescription drugs over the next year. These questions were especially of interest in light of the new Medicare prescription drug benefit that will take effect in January 2006. CMS indicated that data from these questions could be used as a "baseline" to be tracked and measured before and after the Medicare prescription drug benefit goes into effect.

The project coordination team members agreed that these questions would produce useful data but were concerned about increasing the length of the questionnaire. A committee consisting of selected analysts from both project teams was formed and tasked with identifying questions in the 2003 surveys as potential candidates for deletion. After reviewing the distribution of responses to approximately 21 items in the two Medicare CAHPS questionnaires and the use of those variables in the analyses, the teams decided to delete the following three questions from the "Your Personal Doctor or Nurse" section of the 2003 questionnaire. (The question numbers refer to the numbers used in the 2003 MFFS questionnaire.)

- Question 7. Does your personal doctor or nurse know the important facts and decisions about your health care? (Yes, No)
- Question 8. Do you have a physical or medical condition that seriously interferes with your ability to work or manage your day-to-day activities? (Yes, No)
- Question 9. Does your personal doctor or nurse understand how any health problems you have affect your day-to-day life? (Yes, No)

In addition to those questions, we deleted the following three questions about prescription drugs:

- Question 45. Of the times when you needed prescription medicines in the last 6 months, how often were you able to get the medicine? (Never, Sometimes, Usually, Always)
- Question 46. Do you currently have a prescription medicine drug discount card that allows you to buy prescription medicines at a discount? (Yes, No)
- Question 48. How much of the costs of your prescription medicines does this other health insurance cover? (All, Some, or None of the costs)

We deleted Question 45 because cross-tabulations revealed that the “Never” category appeared to be confusing to some respondents. In the 2002 MA survey, about 44 percent of the respondents who said they never got their prescription medicines marked the “Not applicable” answer category in a preceding item that asked how much of a problem it was to get the prescription medicines they needed. Question 46 was selected for deletion because CMS can use its administrative files to identify Medicare beneficiaries who purchased a prescription drug discount card. We deleted Question 48 in the 2003 survey because very few, if any, health insurance companies pay all of the costs of prescription medicines.

2.2 Questions Added for the 2004 MFFS Questionnaire

The project teams added nine new questions to the 2004 MFFS questionnaire, including the following four questions that were added to the series about prescription drugs. (The question numbers refer to the 2004 survey.)

- Question 42. In the last 6 months, how many different prescription medicines did you get or have refilled? (None, 1 to 2, 3 to 5, 6 or more)
- Question 43. About how much, on average, do you pay each month for prescription medicines that you take? (Nothing, Between \$1 and \$50, Between \$51 and \$100, Between \$101 and \$200, Between \$201 and \$300, More than \$300, Don’t know)
- Question 45. In the last 6 months, did you delay getting or did not get a prescription medicine that you needed because you felt that you could not afford it? (Yes, No)
- Question 47. How worried are you that you will not be able to afford the prescription medicines that you need over the next year? (Very worried, Somewhat worried, A little worried, Not at all worried)

As noted earlier, we added these questions so CMS could track and measure changes in beneficiary responses after the Medicare prescription drug benefit goes into effect in 2006. The last two questions in the series were initially developed and tested for use on the Evaluation of the Medicare Preferred Provider Organization (PPO) Demonstration, which is being conducted by RTI for CMS under a different contract. We revised the wording of those two questions slightly for use in the 2004 MFFS and MA CAHPS surveys.

Two new questions about health promotion advice were added to the 2004 Medicare CAHPS surveys. One question asked whether a doctor or other health provider encouraged the sample member to exercise, and the other asked about advice eating a healthy diet (Questions 78 and 79 in the 2004 MFFS questionnaire). We added three other new questions to the MFFS survey (but not to the MA survey) to identify potential sample members who may be eligible for inclusion in the MFFS Reasons Followback (RFB) Pilot Survey. The RFB survey was conducted with a subsample of respondents from the 2004 MFFS survey to determine the reasons why they had a “big problem” getting care in specific access areas (see Section 9 of this report for more information about the 2004 RFB pilot survey). These three new questions are as follows:

- Question 9. In the last 6 months, how much of a problem, if any, was it to get a personal doctor or nurse you are happy with? (A big problem, A small problem, Not a problem)
- Question 92. The Medicare Program is trying to learn more about the health care or services provided to people with Medicare. May we contact you again about the health care or services that you received? (Yes, No)
- Question 93. Please write your daytime telephone number below.

Question 9 is a follow-up to the core CAHPS question that asked how much of a problem it was to find a personal doctor or nurse *since joining Medicare* (Question 8 in the 2004 survey) and was asked only if the response to Question 8 was “big problem.” We added Questions 92 and 93 to obtain the sample members’ consent to be recontacted if they were selected to participate in the RFB pilot survey. RTI project staff tested all of the new questions with a small sample of Medicare beneficiaries in spring 2004. A report summarizing the results of the questionnaire testing activity was submitted to CMS in July 2004.

2.3 Summary of Questionnaire Changes

We deleted six questions from the MFFS questionnaire but added nine questions, bringing the total number of questions included in the 2004 survey to 93. Other changes made to the questionnaire, along with those described in the preceding sections, are summarized below in a list format for ease of reference:

- We deleted three questions from the series about the sample members’ personal doctor or nurse:
 - the question that asked if their personal doctor or nurse knew the important facts and decisions about their health care (Question 7 in the 2003 survey)
 - the question that asked about having a physical or medical condition that seriously interfered with their ability to work or manage their day-to-day activities (Question 8 in the 2003 survey)
 - the question that asked if their personal doctor or nurse understood how any health problems they had affected their day-to-day life (Question 9 in the 2003 survey)

- We added a new question (Question 9) that asks how much of a problem, if any, it was for the sample members to get a personal doctor or nurse they were happy with *in the last 6 months*.
- We made a number of changes to the series of questions about prescription drugs, including deleting three of the old questions and adding four new questions. We deleted the question that asked for the frequency with which the sample members were able to get the prescription medicines they needed (Question 45 in the 2003 survey).
- We deleted the question that asked about having a prescription drug discount card (Question 46 in the 2003 survey) because CMS has that information in its administrative files.
- The third question deleted from the series about prescription drugs was the question that asked how much of the costs of the sample members' prescription medicines were paid by other insurance (Question 48 in the 2003 survey).
- We added a new question (Question 42) to determine how many *different* prescription medicines the sample members got or had refilled in the last 6 months.
- Another new question (Question 43) was added to the series about prescription medicines to determine how much, on average, the respondents paid each month for prescription medicines.
- We added a new question (Question 45) to determine if sample members delayed getting or did not get a prescription medicine that they needed because they felt that they could not afford it.
- The last new question (Question 47) added to the series about prescription drugs asked the sample members how worried they were that they will not be able to afford the prescription drugs that they need over the next year. CMS is interested in tracking and measuring the responses to this question over time, particularly after the new Medicare prescription drug benefit becomes available in 2006.
- We retained the question in the prescription drug question series asking if the sample members had any insurance that paid at least some of the costs of prescription medicines (Question 46). However, we deleted the transition statement that preceded that question ("Medicare does not pay for prescription medicines unless they need to be injected by a doctor or you are in the hospital"). We also deleted the phrase "Not including Medicare."
- We changed the month and year in Question 76 from December 2002 to December 2003.
- We added two new questions about health promotion advice, including a question to determine if a doctor or other provider had encouraged the sample members to

exercise (Question 78) and one to determine if a doctor or other health provider had encouraged them to eat a healthy diet (Question 79).

- We added a new question asking the sample members if we could contact them in the future about health care services that they received (Question 92).

SECTION 3 SAMPLE SELECTION, WEIGHTING, AND DATA PRESENTATION

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In Section 3, we summarize our procedures for assigning design-consistent weights to Medicare CAHPS[®] Fee-for-Service (FFFS) Survey respondents for use in the analysis and presentation of MFFS data. We review the sample frame applicable to all 5 years of the survey thus far and contrast the current year's sampling methodology with those in previous years to highlight its advantages. To examine the effects of applying our weights, we provide a detailed, state-by-state comparison of the unweighted and weighted proportions of beneficiaries reporting the highest scores for each of the five CAHPS indicators on the CMS web site.¹ Later in this section, we discuss some new aspects of the MFFS survey data.

3.1 Sample Selection and Weighting

Analysis weights enable design-consistent estimation of population parameters by scaling the disproportionalities between the sample and the population. For the MFFS survey, the weights may be viewed as inflation factors that account for the number of beneficiaries in the target population that a sample member represents. The initial component of an analysis weight for a sample member is the selection probability that is specified by the sample design. Typically, adjustments are then made to the weights to compensate for potential biases attributable to differential response and coverage among sample members.

We begin with a description of the MFFS sampling frame and its coverage of the MFFS target population. Next, we compare the selection allocation of this year's MFFS survey sample with those of previous years. Then, we describe how the initial sampling weights were assigned to sample members and how the initial weights of sample respondents were post-stratified to specified MFFS population counts. Finally, we present state-level proportions (weighted and unweighted) for five CAHPS indicators—Care Quickly composite, Good Communication composite, Needed Care composite, Rate Medicare, and Rate Health Care—to graphically depict the effects of the weights on our case-mix adjusted estimates.

3.1.1 MFFS Sampling Frame

The sample of 178,650 beneficiaries selected for the 2004 MFFS was drawn from a sampling frame constructed from the July 2004 version of CMS' Enrollment Database (EDB). The frame comprised almost 32.5 million persons who were enrolled in fee-for-service Medicare for at least the prior 6 months, did not have a representative payee, were over 18 years of age, and resided in the United States, Puerto Rico, or the Virgin Islands. The frame included 3,625 beneficiaries who were initially sampled but subsequently died before or during data collection and were therefore determined to be *ineligible* for the survey.

¹ Medicare Personal Plan Finder (MPPF) in <http://www.medicare.gov>.

The frame also included beneficiaries who did not speak English or Spanish¹ and beneficiaries who were mentally or physically incompetent and without access to a proxy. We classified these individuals as survey *eligible* to be consistent with the Medicare Advantage (MA) CAHPS Survey. **Table 3.1** presents the eligibility status of the 2004 MFFS sample. Unlike the MA survey, we classified beneficiaries who were institutionalized during data collection as eligible for the survey.²

Table 3.1
Eligibility status of 2004 MFFS sample members

		Sample members	
		Number	Percent
Eligible	Completed questionnaire	117,102	65.5
	Proxy respondent	7,810	4.4
	Received help with survey	11,262	6.3
	Beneficiary respondent	98,030	54.8
	Refused	20,434	11.4
	Mental/physical barrier	1,700	1.0
	Language barrier	1,407	0.8
	Other nonrespondents		
	Deliverable address and phone	31,019	17.4
	Deliverable address and no phone	2,815	1.6
	Undeliverable address and phone	62	0.0
	Undeliverable address and no phone	486	0.3
	Total eligible sample members	175,025	98.0
	Ineligible	Deceased	3,625
Total sample		178,650	100.0

¹ The questionnaire was only administered in English and Spanish.

² Institutionalized MA beneficiaries are identified on the Group Health Plan file and excluded from the sampling frame prior to selecting the MA sample. MFFS beneficiaries are not included on this file, and institutionalized status is not maintained on the EDB. Therefore, institutionalized MFFS beneficiaries cannot be excluded from the sampling frame prior to drawing the MFFS sample.

3.1.2 Historical MFFS Selection Allocation

In the 2000 MFFS survey, the selection allocation was defined to be 600 beneficiaries from each of the 275 geographic units (geounits) in the United States and 3,000 beneficiaries from Puerto Rico, for a total sample size of 168,000 beneficiaries in 276 geounits. For the 2001 MFFS survey, no change was made to the number of geounits, but the total sample size was increased to 177,950 beneficiaries. For the 2002 survey, no change was made to the number of geounits or to the total (national) MFFS sample size from the 2001 survey, but we did introduce a reallocation of the sample. For the 2003 MFFS survey, we added one geounit (with a sample size of 700) for the Virgin Islands, bringing the total number of geounits in our study design to 277 and our total sample size to 178,650. As in 2002, we reallocated the sample for the 2003 survey, based on responses from the previous year.

3.1.3 2004 MFFS Selection Allocation

For the 2004 survey, no changes were made to the number of geounits or to the total (national) MFFS sample size from the 2003 survey, but we reallocated sample between 2003 and 2004 to provide better power for estimates in counties that experienced significant downward changes in MA enrollments and in counties with insufficient sample sizes owing to higher than expected nonresponse in the previous year. In particular, selected counties in the five “donor” states with the greatest effective sample size when compared with MA contributed a proportionate amount of their allocated sample in excess of 330 completes from the previous year to recipient counties in Idaho and Kentucky. In 2004, these five donor states were California, Florida, New York, Ohio, and Pennsylvania.

Appendix B provides a summary of the sample allocations within each geounit, across all 5 years of the CAHPS MFFS survey thus far.

Houston Reallocation—In the 2000 through 2003 surveys, two counties in Texas were unintentionally exchanged or “swapped” between two geounits. Specifically, Harris County—which includes the city of Houston—had been included in geounit 237 with other less populous counties, whereas Montgomery County (geounit 236) was treated as a standalone county geounit and received a sample allocation of 600. This exchange resulted in oversampling Medicare beneficiaries in Montgomery County and somewhat undersampling them in Harris County. (See *Appendix C* for details of the reallocation involving these two Texas reporting units.)

Beginning with the 2004 survey, geounit 236 no longer contained only Montgomery County and instead contained only Harris County. As a standalone county geounit, geounit 236 continued to receive a sample allocation of 600. Geounit 237, which had previously included Harris County, now included Montgomery County in its place. Given the population differential in the two counties that were exchanged, the sample in geounit 237 was proportionally reallocated in the most recent survey year’s draw from the EDB to better reflect the relative sizes of the population of beneficiaries in the counties that comprise geounit 237. Our estimates for the populations in these counties were based on counts used for the sampling weights from the 2003 survey implementation, which are based in turn on our most recent census of the EDB (drawn October 22, 2003). The “Sample Allocation (2004)” column in *Appendix C* contains the results of the calculations used to proportionally redistribute the 800 sample members in geounit 237 to

better match population distributions in these counties. These values reflect the modified allocations that were used for the 2004 sample, drawn from the EDB on August 10, 2004.

This reallocation results in an inconsistency between the first 4 years of the survey and 2004, with respect to the counties that comprise geounits 236 and 237. To ensure that accurate comparisons and inferences are being made for analyses across years, users of these data must take into account the “swap” of Montgomery and Harris counties in Texas that took place in 2004. All other geounits in the 50 United States and District of Columbia were consistent geographically throughout the 5-year period.

3.1.4 MFFS Target Population

Ideally, the sampling frame would include all members of the MFFS *target population*—the entire population of MFFS-eligible beneficiaries to which we make inference. However, as had been the case in all previous years of the survey, changes in the composition of the MFFS population (e.g., through beneficiary deaths or new enrollments) during the 5 months between sample selection and the end of data collection make complete coverage of the target population impossible. In consultation with the CMS Project Officer, therefore, we defined the MFFS target population to include all survey-eligible beneficiaries as of October 2004. This target date was chosen for two reasons: (1) it corresponds to the peak of data collection; and (2) it is about the same amount of time after sample selection (approximately 2 months) as the target date for the CAHPS MA survey. Almost 32.6 million MFFS beneficiaries on the October 2004 version of the EDB satisfied the eligibility requirements for the survey.

3.1.5 Initial Sampling Weights

We stratified by county to vary the sampling rates of beneficiaries selected for the MFFS survey to achieve the design goals of the study (Elliott et al., 2000). In general, beneficiaries in rural counties and less populous states were sampled at higher rates than those in urban counties and populous states. The median county-level sampling rate was one selection per 177 MFFS beneficiaries, with beneficiaries in 50 percent of the counties receiving between one selection per 147 beneficiaries and one selection per 206 beneficiaries. The highest county-level sampling rate was one selection per 2.24 beneficiaries (Pierce County, North Dakota), while the lowest rate was one selection per 871 beneficiaries (Wetzel County, West Virginia). As a result of this differential selection, the sample distribution produced by the stratified selection of MFFS beneficiaries is not proportional to the population distribution from which the sample was selected.

We assigned an initial sampling weight to each selected beneficiary as the inverse of the selection probability to reflect the differential selection rates of beneficiaries from each state or county. For example, beneficiaries selected from the county having the highest sampling rate were assigned an initial weight of 2.24, compared with an initial weight of 871 for beneficiaries selected from the county having the lowest sampling rate. This variability in the sampling weights induces unequal weighting effects that inflate the variances of the sample estimates.

Table 3.2 summarizes the unequal weighting effects attributable to the initial sampling weights for various MFFS subpopulations.

Table 3.2
2004 MFFS sampling weight post-stratification summary

Post-stratum	Number of respondents	Initial sampling weights			Post-stratified weights		
		Weight sum (000s)	Unequal weighting effect	Effective sample size	Weight sum (000s)	Unequal weighting effect	Effective sample size
Overall							
USA, PR, and VI	117,102	21,011	1.21	96,547	32,561	1.33	88,258
Dual eligibility							
No	103,404	18,513	1.20	85,906	27,921	1.29	80,222
Yes	13,698	2,499	1.28	10,706	4,641	1.46	9,382
Age							
Under 65	13,327	2,370	1.20	11,097	4,371	1.30	10,266
65-69	27,406	4,922	1.21	22,672	7,471	1.31	20,876
70-74	26,181	4,711	1.22	21,411	6,779	1.33	19,737
75-79	22,533	4,042	1.21	18,601	5,874	1.32	17,060
80 +	27,655	4,966	1.21	22,773	8,067	1.33	20,807
Race							
White	103,614	18,519	1.19	86,757	27,667	1.26	82,094
Black	9,006	1,622	1.29	6,989	3,011	1.39	6,471
Other	4,482	870	1.44	3,115	1,883	1.63	2,754
Gender							
Male	51,035	9,169	1.21	42,046	14,196	1.34	38,057
Female	66,067	11,842	1.21	54,502	18,366	1.32	50,210
CMS region							
I. CT, ME, MA, NH, RI, VT	8,169	1,116	1.28	6,367	1,750	1.39	5,887
II. NJ, NY, PR	10,033	2,001	1.20	8,366	3,516	1.32	7,629
III. DE, DC, MD, PA, VA, WV	13,490	2,180	1.22	11,056	3,387	1.23	10,925
IV. AL, NC, GA, SC, FL, KY, MS, TN	24,435	4,609	1.08	22,586	7,063	1.11	22,003
V. IL, IN, MI, MN, OH, WI	21,039	4,146	1.20	17,475	6,128	1.32	15,957
VI. AR, LA, NM, OK, TX	13,016	2,364	1.11	11,756	3,626	1.16	11,219
VII. IA, KS, MO, NE	7,787	1,222	1.14	6,812	1,708	1.15	6,752
VIII. CO, MT, ND, SD, UT, WY	5,619	679	1.31	4,292	941	1.35	4,174
IX. AZ, CA, HI, NV	8,412	1,919	1.38	6,084	3,318	1.60	5,274
X. AK, ID, OR, WA	5,102	775	1.16	4,385	1,124	1.20	4,245
States							
Alabama	2,401	411	1.01	2,387	601	1.02	2,347
Alaska	462	29	1.00	462	45	1.02	451
Arizona	1,291	321	1.05	1,234	502	1.06	1,220
Arkansas	1,645	295	1.03	1,602	421	1.04	1,586
California	5,546	1,410	1.38	4,020	2,523	1.58	3,512
Colorado	1,246	230	1.01	1,228	336	1.04	1,202
Connecticut	1,518	284	1.03	1,475	451	1.05	1,446
Delaware	1,204	76	1.00	1,199	113	1.02	1,177
District of Columbia	658	34	1.00	658	62	1.03	642
Florida	5,984	1,381	1.04	5,770	2,227	1.05	5,682

(continued)

Table 3.2
(continued)

Post-stratum	Number of respondents	Initial sampling weights			Post-stratified weights		
		Weight sum (000s)	Unequal weighting effect	Effective sample size	Weight sum (000s)	Unequal weighting effect	Effective sample size
States							
Georgia	3,060	578	1.02	2,991	884	1.04	2,930
Hawaii	794	70	1.33	595	108	1.38	576
Idaho	1,189	114	1.21	982	152	1.23	964
Illinois	3,637	914	1.51	2,405	1,442	1.70	2,141
Indiana	3,211	540	1.00	3,196	788	1.02	3,160
Iowa	1,740	311	1.20	1,453	423	1.21	1,441
Kansas	1,625	257	1.15	1,409	351	1.16	1,395
Kentucky	2,349	392	1.17	2,004	582	1.19	1,966
Louisiana	1,881	310	1.06	1,782	498	1.07	1,754
Maine	1,716	151	1.02	1,688	213	1.03	1,669
Maryland	1,990	379	1.06	1,882	604	1.06	1,872
Massachusetts	2,551	445	1.33	1,920	730	1.42	1,796
Michigan	4,440	892	1.13	3,918	1,313	1.17	3,783
Minnesota	2,237	397	1.00	2,227	531	1.02	2,204
Mississippi	2,060	269	1.26	1,632	395	1.29	1,601
Missouri	2,992	487	1.04	2,875	707	1.06	2,820
Montana	506	96	1.00	506	133	1.01	501
Nebraska	1,430	167	1.19	1,199	227	1.18	1,213
Nevada	781	118	1.07	733	186	1.10	710
New Hampshire	1,268	110	1.04	1,224	167	1.04	1,222
New Jersey	3,385	626	1.17	2,903	1,038	1.18	2,870
New Mexico	1,374	130	1.16	1,188	195	1.15	1,193
New York	5,724	1,171	1.14	5,004	2,055	1.27	4,506
North Carolina	3,903	708	1.09	3,576	1,069	1.11	3,524
North Dakota	1,450	70	1.83	792	94	1.84	790
Ohio	4,344	898	1.02	4,271	1,362	1.04	4,163
Oklahoma	1,671	307	1.00	1,665	441	1.02	1,638
Oregon	1,271	223	1.01	1,258	319	1.03	1,236
Pennsylvania	4,630	927	1.06	4,351	1,446	1.06	4,354
Puerto Rico	568	199	1.00	568	412	1.03	552
Rhode Island	598	61	1.00	596	103	1.02	584
South Carolina	1,941	382	1.01	1,921	564	1.03	1,890
South Dakota	1,032	84	1.24	831	113	1.26	820
Tennessee	2,737	489	1.04	2,633	742	1.05	2,595
Texas	6,445	1,322	1.09	5,898	2,071	1.15	5,583
Utah	881	153	1.02	860	201	1.04	844
Vermont	518	64	1.00	518	87	1.01	514
Virgin Islands	356	6	1.00	356	11	1.02	349
Virginia	3,228	564	1.18	2,728	865	1.22	2,648
Washington	2,180	410	1.07	2,031	609	1.10	1,978
West Virginia	1,780	201	1.46	1,219	297	1.52	1,173
Wisconsin	3,170	506	1.02	3,093	693	1.04	3,054
Wyoming	504	46	1.00	504	63	1.01	499

NOTE: Post-stratification was used to force the weight sums of MFFS respondents to agree with totals obtained from the October 2004 version of the EDB (i.e., the post-stratified weight sum). The unequal weighting effect (UWE) measures the amount of variance inflation above an equally weighted sample. The effective sample size is the number of respondents divided by the UWE.

3.1.6 Post-Stratification of the Initial Sampling Weights

The response rates for the 2004 MFFS survey varied considerably with respect to race (Whites higher than Blacks [African Americans] and Other/Unknown race), age (younger seniors higher than those over 85 years of age), dual eligibility, and region (Midwest higher than others) (see **Table 4.2** in Section 4 of this report). As a result, the respondent distribution is composed of too few Blacks and Other/Unknown, too few dual eligibles, and too many beneficiaries from the Midwest as compared with the original sample distribution. These differential response-rate patterns combined with differential answer patterns to the survey represent a potential for nonresponse bias.

To reduce the potential biasing effects of differential nonresponse, we post-stratified the initial sampling weights of respondents to 337 separate counts of the number of eligible MFFS beneficiaries obtained from the October 2004 version of the EDB. (The EDB counts exclude eligible beneficiaries who died between October 2004 and February 2005, the end of data collection.) The counts include totals for each of the 277 geounits in the United States, Puerto Rico, and Virgin Islands, as well as 60 totals formed by the intersection of the following demographic variables:

- Age Category (5): Under 65, 65-69, 70-74, 75-79, 80 and Older
- Gender (2): Male, Female
- Race (3): White, Black, Other/Unknown
- Dual Eligibility (2): Yes, No

Readers should note that the 277 geographic counts “cut across” the 60 demographic counts in that each sample member belongs to both a geographic cell and a demographic cell. Therefore, we used a generalized exponential model (GEM) (Singh and Folsom, 2000) to ensure that the adjusted weights sum to all 337 counts while imposing bounds on the adjustment factors so that extreme weights are controlled. GEM is a generalization of the well-known logit method of Deville and Sarndal (1992), and the usual raking method can be obtained as a special case.

As a result of the above, the post-stratified weights of eligible respondents sum to 32.6 million—the number of survey-eligible beneficiaries on the October 2004 version of the EDB.

Table 3.2 summarizes the post-stratification adjustments we made to the sampling weights. At the national level, an average adjustment factor of 1.55 (32,561/21,011) was applied to the initial sampling weights of eligible respondents. Because of differential nonresponse, however, the adjustment factors varied substantially across the post-strata. For example, an average adjustment factor of 2.07 (412/199) was applied to beneficiaries in Puerto Rico to compensate for the low (47.3 percent) response rate there. At the other extreme, respondents in Utah (which had a 77.3 percent response rate) only required an average adjustment of 1.31.

The overall unequal weighting effect after post-stratification was 1.33, compared with 1.21 for the initial sampling weights. This increase can be interpreted as the “price” paid (in terms of variance inflation) for ensuring that the weighted distribution of respondents reflects the

distribution of the October 2004 version of the EDB. Although the unequal weighting effect varied among the post-strata, the increase attributable to post-stratification did not seriously affect the effective sample sizes.

3.1.7 Effects of Weighting

Weighted analysis of the CAHPS MFFS survey data offers the following advantages:

- **Bias reduction.** Weights can eliminate selection bias caused by sampling beneficiaries at different rates. For example, sample members in the county with the highest sampling rate were selected at 389 times the rate of sample members in the county with the lowest sampling rate. In addition, weights can reduce nonresponse bias that results from differential response rates. It should be noted that case-mix adjustment (CMA) also may be used to reduce response bias.
- **Improved coverage.** Changes in the composition of the MFFS population during the 5 months between sample selection (in August) and the end of data collection (in February) made complete coverage of the target population impossible. Post-stratification of the design weights of respondents ensures that the weighted distribution of respondents reflects the true (as of October 2004) fee-for-service Medicare population distribution with respect to age, gender, race, dual eligibility, and geounit.

The primary disadvantage of weighted analysis is the increased variances that often accompany weighted estimates. However, this is not the case for the CAHPS MFFS survey, because an overall UWE of 1.33 suggests that our design-consistent weights have only a slight effect on the efficiency of the estimates in comparison to a randomly selected sample of the same size. We found no discernible increase in the variances when weights were used to generate state-level estimates for two CAHPS ratings (Rate Medicare and Rate Health Care) and three CAHPS composites (Needed Care, Care Quickly, and Good Communication). Another disadvantage of weighted analysis often cited by researchers is that special software is needed to analyze weighted data. However, recent changes to the CAHPS macro enable weighted estimates of CAHPS outcomes to be generated easily.

We evaluated the effect of the MFFS analysis weights on the accuracy of the survey estimates by comparing the mean square errors (MSEs) of weighted estimates with the corresponding MSEs of unweighted estimates. The MSE, defined as the sum of the bias squared and the variance, is used to measure the combined effect of bias and variance on the survey estimates. We assumed that the weighted estimates represent relatively unbiased estimates because of the bias reduction and improved coverage that the weights offer. We estimated the bias associated with the unweighted estimates as the deviation from the corresponding weighted estimate.

We used the CAHPS macro with the CMA factors to generate both the weighted and unweighted state-level estimates of the two CAHPS ratings and three composites. The estimates are the percentage of Medicare beneficiaries reporting the most-positive CAHPS outcome. We included CMA in the evaluation because most of our survey estimates are case-mix adjusted. In

addition, comparing weighted and unweighted CMA estimates enabled us to account for any reduction in response bias that is attributable to the CMA factors. If weights do not reduce the MSEs of key CAHPS estimates (compared with unweighted), then there is little motivation for their use in the analysis. In this situation, the weights are said to be “ignorable.” Examples of situations where weights are ignorable include the following:

- There is little or no difference between weighted and unweighted estimates.
- The variance inflation attributable to weighting exceeds the squared reduction in bias (i.e., the weighted MSE is greater than the unweighted MSE).

In *Figure 3.1*, we plot the weighted and unweighted root MSEs (i.e., the square root of the MSEs) to display the differences in the same scale as the percentage estimates. For example, in the plot labeled “Rate Medicare,” the root MSE for the unweighted CMA estimate for the state of New York (NY) is 2.1 percent, compared with 0.6 percent for the weighted CMA estimate. Because the variances of the weighted and unweighted estimates are virtually identical, the 1.5 percent difference in the root MSEs can be attributed to the bias of the unweighted CMA estimate. Overall, the results indicate that the weights are ignorable for many state estimates, especially those for the Good Communication composite. However, the weights are nonignorable (in terms of reduced MSEs) for a number of state estimates of the overall ratings of Medicare and health care and the Needed Care and Care Quickly composites. Because the root MSEs all appear on or below the diagonal, we conclude that the weighted analysis of the CAHPS MFFS survey data can improve the accuracy of state-specific estimates of CAHPS outcomes without adversely affecting the associated statistical power. Bias tends to be a more important component of MSE for larger sample sizes.

3.2 Data Presentation

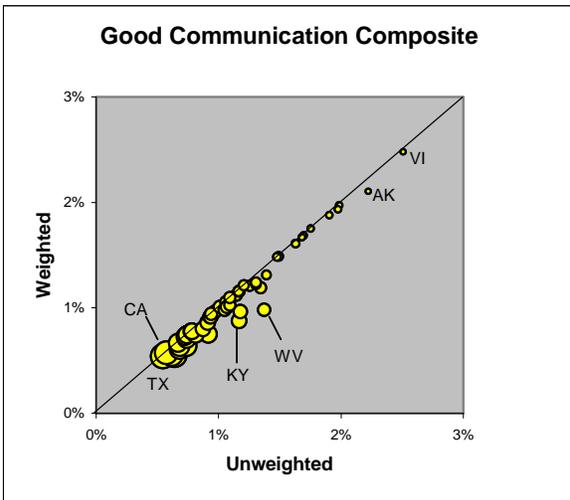
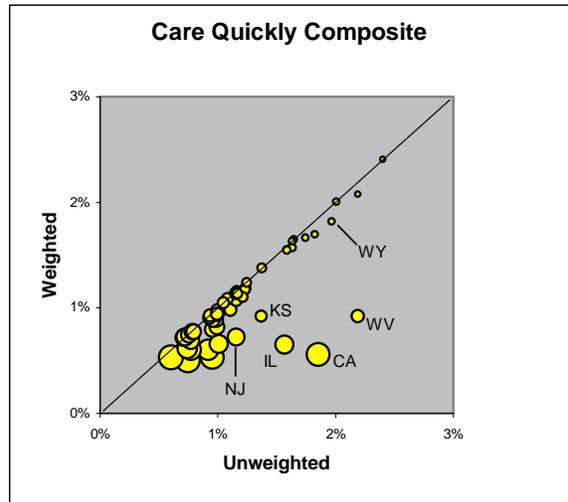
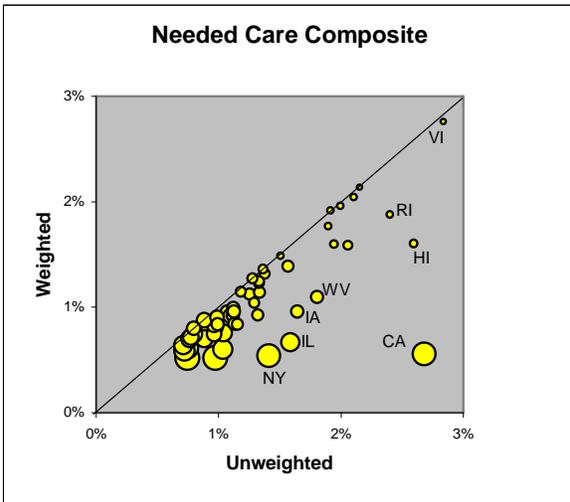
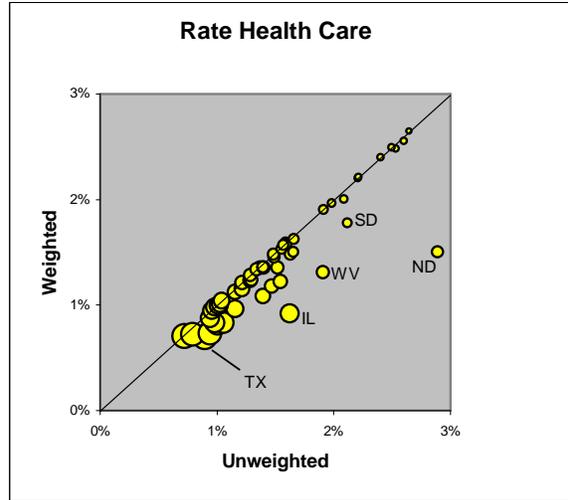
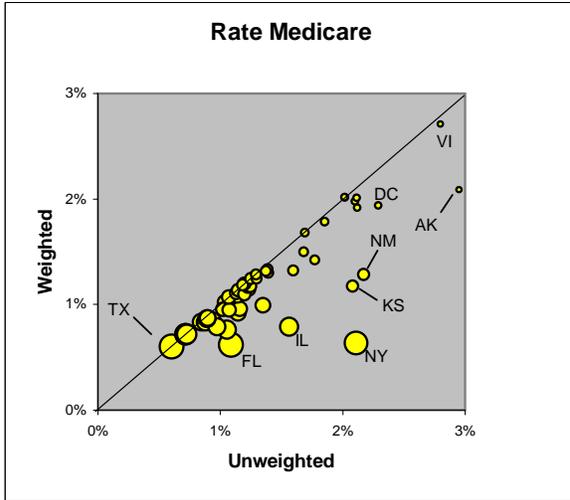
In this section, we present new aspects of the MFFS survey data and suggest general methods for using the data for analytical purposes.

3.2.1 New and Revised Analysis Variables

Disability—We constructed a three-category disability variable based on the activities of daily living (ADL) survey question with the following categories:

- Severe ADL limitations
- Mild ADL limitations
- No ADL limitations

Figure 3.1
Comparison of root MSEs of weighted and unweighted state estimates
of CAHPS outcomes



Discussion

Mean Square Error (MSE) formalizes the tradeoff between low bias and low variance, in that $MSE = (Bias)^2 + Variance$. Plotting \sqrt{MSE} allows for the display of variation in the original units of measure (i.e., proportion of Medicare beneficiaries rating the selected indicator most positively). The states with greater numbers of respondents (i.e., larger bubbles) tend to congregate near the origins of these plots. This is to be expected, since variance is reduced as sample size increases. Observations in the lower right half of each plot indicate that a state's weighted estimated proportion has less MSE than its unweighted counterpart. Since most of the observations in these plots fall in this region, we can conclude that the use of weights is beneficial, because they yield more accurate estimates of the true population proportions and preserve statistical power.

The survey question used to create the ADL variable asked the beneficiary, “Because of a health or physical problem, do you have any difficulty in doing the following activities? (Please mark one response for each activity.)”

- Bathing
- Dressing
- Eating
- Getting in or out of chairs
- Walking
- Using the toilet

The available responses were as follows:

- I am unable to do this activity
- Yes, I have difficulty
- No, I do not have difficulty

Respondents who answered “I am unable to do this activity” for any of the ADLs and those who answered “Yes, I have difficulty” to three or more of the ADLs were coded as “Severe ADL limitations.” Respondents who answered “Yes, I have difficulty” to one or two ADLs were coded as “Mild ADL limitations.” Finally, respondents who answered “No, I do not have difficulty” were coded as “No ADL limitations” for the ADL variable.

3.2.2 Sample Size and Statistical Significance

Large sample sizes, such as those for the MFFS surveys, often produce statistically significant results regardless of the sizes of the minimum detectable differences.

Statistical significance should not be confused with *practical significance*. A small real effect, of no practical importance, may be statistically significant in a very large sample. A nonsignificant result does not demonstrate that there is no effect. Rather, it suggests that the data are consistent with there being no effect, and in small samples, this can happen even when the real effect is large. For analyses with large sample sizes, both statistical and practical significance should be considered.

Care should also be taken when performing statistical analyses of cross-classifications of several domains. Some cells in the cross-classifications might turn out to have small sample sizes (for instance, race by education cross-classifications might yield small sample sizes for Asians who have completed less than a high school education). For such cases, we recommend that a result (e.g., estimates, p -values) based on a small sample size be marked with an asterisk denoting it as potentially unreliable, in a statistical sense, if the sample size is less than a fixed

number of individuals. Analysts might also consider the use of relevant small area estimation techniques to produce more reliable estimates in these cases.

3.2.3 Trend File

The MFFS trend data file was expanded to include the survey results from all 5 years of the MFFS survey (2000 through 2004). Likewise, the crosswalk that tracks differences in the survey instruments over the years was expanded to include the fifth year. (The crosswalk is included as *Appendix D* in this report.) As before, the crosswalk includes information on whether differences in questions across years are differences in question wording and/or differences in skip patterns. Some of the differences in the questions used to calculate the composites and ratings are highlighted below.

In the 2000 survey, the following questions are different from those in the 2001 through 2004 surveys:

- The first question in the Needed Care composite (Question 4 in the 2000 survey—“How much of a problem, if any, was it to get a personal doctor or nurse you are happy with?”) does not get asked if beneficiaries do not answer “Yes” to Question 2 asking if they got a new personal doctor. Question 2 does not exist in the 2001 through 2004 surveys, and Questions 3 to 5 are skipped if Question 2 is “No.”
- The “rate your personal doctor” question (Question 7) is also different in 2000 because of Question 2. Question 5 is the gateway to Question 7; however, if Question 2 is answered “No,” respondents never get to Question 5 but do get to Question 7, regardless of how they would have answered Question 5. Again, this is different in the 2001 through 2004 surveys.

In the 2002 through 2004 surveys, the following questions are different from those in 2000 and 2001:

- The “rate your specialist” question in 2002 through 2004 is NOT skipped by the question “Did you or your doctor think you needed to see a specialist?” However, in 2000 and 2001, “rate your specialist” is skipped by that question.
- The third and fourth questions in the Needed Care composite (“In the last 6 months, how much of a problem, if any, was it to get the care, tests, or treatment you or a doctor believed necessary?” and “In the last 6 months, how much of a problem, if any, were delays in health care while you waited for approval from Medicare?,” respectively) can be skipped by two different gateway questions in 2002 through 2004. In 2000 and 2001, there is only one preceding gateway question.

Some questions have changed multiple times over the years:

- The wording of the fourth question in the Care Quickly composite changed in 2002 to “In the last 6 months, how often did you see the person you came to see within 15 minutes of your appointment?” from what it had been in previous years (“In the last 6 months, how often did you wait in the doctor’s office or clinic more than 15 minutes”

past your appointment time to see the person you went to see?”). The question further changed in 2003 and 2004 to become, “In the last 6 months, how often were you taken to the exam room within 15 minutes of your appointment?”

Users of the trend file should be aware of the differences in the survey instruments through the years. These differences might lead to statistically significant trends that may not be real because of differences in the wording of particular questions or other changes (such as the Houston reallocation, described in Section 3.1.3 and *Appendix C*). The trend file assumes that the samples from each of the survey years are independent of each other and, hence, can be combined as one sample.

SECTION 4 DATA COLLECTION

by Linda L. Dimitropoulos, Ph.D., RTI

In Section 4, we describe the data collection protocol and results for the 2004 Medicare CAHPS[®] Fee-for-Service (MFFS) Survey. One of the benefits of conducting an annual survey is that it provides an opportunity to learn from each year of the study and implement changes to the methodology. We have made changes to the methodology over the past 5 years of the MFFS survey based on lessons learned from each consecutive implementation. The data collection team has contributed to four presentations that reviewed aspects of the methodology from mode effects, the method of mailing for the third-wave follow-up, and the response rates associated with the number of call attempts made to each telephone number (Campbell et al., 2004, 2005; Dimitropoulos, Campbell, and Iannacchione, 2003; Iannacchione et al., 2002). Although all of the methodological changes were important, two are notable for their direct impact on response rates and costs. First, between the 2000 and 2001 implementations, we added 4 weeks onto the data collection period. This change allowed more time for processing returned surveys before the next wave began and for tracking new addresses and telephone numbers of sample members who had relocated between the time the sample was drawn and the time the survey materials were mailed. The second major change was the addition of the Social Security Administration (SSA) database for obtaining telephone numbers for sample members who did not respond to the mail survey. The increased access to telephone numbers significantly reduced the number of surveys that were mailed via overnight courier during the third-wave follow-up.

4.1 Data Collection Schedule

The 2004 Medicare Satisfaction Survey is primarily a self-administered survey composed of 93 questions that are organized by the following sections:

- Personal doctor or nurse
- Getting health care from a specialist
- Health care in the last 6 months
- Other health services
- Paperwork and information
- Overall rating of Medicare
- About [the respondent]

The MFFS is conducted as a mail survey but offers sample members the option of calling a toll-free number and completing the survey as a telephone interview. There is strong evidence that providing multiple modes of responding improves overall response (Dillman, 2000). The follow-up data collection effort for nonrespondents to the mail survey includes a telephone

follow-up of nonrespondents for whom we could locate a telephone number and a third-wave survey package mailed to nonrespondents for whom we could not find a telephone number.

The data collection period was 21 weeks starting with the mailout of the prenotification letter on September 8, 2004, and ending with the close of the telephone follow-up on February 7, 2005. The overall data collection schedule is shown in *Table 4.1*.

Table 4.1
2004 MFFS data collection schedule

Activity	Date
Mail survey	
Prenotification letters sent	09/08/2004
Toll-free line opened	09/08/2004
Inbound telephone center opened	09/09/2004
First survey mailed	09/13/2004
First thank you/reminder letter sent	09/20/2004
Cutoff date for Wave 1	10/15/2004
Second survey mailed	11/03/2004
Second thank you/reminder letter sent	11/08/2004
Cutoff date for Wave 2 for telephone follow-up	11/24/2004
Cutoff date for Wave 2 for Wave 3 mailing	12/13/2004
Follow-up data collection	
Telephone follow-up began	12/01/2004
Third survey sent (FedEx)	01/03/2005
Cutoff date for returned mail surveys	02/07/2005
Toll-free line closed down	02/07/2005
Telephone follow-up ended	02/07/2005

4.2 Mail Survey

The data collection plan for the mail survey followed the traditional method of making five contacts: (1) advance letter, (2) first survey package, (3) thank you/reminder postcard, (4) second “replacement” package, and (5) second thank you/reminder postcard. In addition, we mailed a third survey package that, for the first time, was followed by a third thank you/reminder postcard sent to all remaining sample members.

RTI selected a stratified random sample of 178,650 noninstitutionalized MFFS beneficiaries from the CMS Enrollment Database (EDB) (see Section 3 of this report for details). The sample was drawn from 277 geographically distinct areas in the United States, Puerto Rico, and Virgin Islands. Sample sizes in geounits ranged from 500 to 2,000. After the sample was selected, the address file was run through the U.S. Postal Service National Change of Address (NCOA) database, which updates the addresses for respondents who have moved since the sample was drawn. Any sample file address that was not updated through NCOA was mailed using the original CMS-provided address, which was modified to conform to the standard postal format with three lines of address: name, street address, and city/state/zip code.

Pearson NCS printed all materials and processed and scanned the returned questionnaires. RTI provided oversight to Pearson NCS to ensure that the correct survey procedures were implemented and that specified quality assurance and quality control procedures were followed. Pearson NCS submitted proofs of all materials prior to printing, and all survey materials were reviewed and approved by CMS and RTI before being sent to the respondents.

Quality control is critical to the MFFS, and a number of quality control procedures have been put into place to minimize errors during data collection. The flow of the cases through this complex process is monitored by the use of two sets of disposition codes that are assigned to cases as they progress through the data collection activities. The codes allow staff to track and monitor production and to create status reports. The first set of codes is used to track the mail survey, and the second set of codes is used to track cases that were handled by telephone. The telephone disposition codes provide a means to monitor and report case status and production. The codes are also used to determine next steps in the contacting process.

4.3 Inbound Respondent Calls

All survey materials included the study's toll-free number for respondents to call if they had questions about the study or to request a telephone interview. The toll-free line was in operation 6 days a week, from 8:00 a.m. EST until 8:00 p.m. EST Monday through Friday and from 8:00 a.m. to 5:00 p.m. EST on Saturday. A voice mail system was used to take information from callers after hours and to prompt callers to leave their name, phone number, and ID for later contact by telephone center staff. All voice mail messages were returned the same day (for early morning messages) or the following day (for overnight messages). If a sample member indicated a specific time to call back, this preference was accommodated. During the peak calling period following the first-wave mailing, if the call-in line was busy due to high call volume, a message was placed on the answering machine notifying callers that the system was experiencing a high volume of calls and telling them that they could stay on the line or leave their number for a callback. A maximum of 16 callback attempts was made to each respondent.

4.4 Nonresponse Follow-up

The nonresponse follow-up included both telephone and mail components and started approximately 3 weeks after the second survey was mailed. The telephone follow-up was conducted with 70,293 nonrespondents for whom RTI found a telephone number. The 3,359 remaining nonrespondents received a third survey package by mail.

4.4.1 Telephone Follow-up

The nonresponse follow-up by telephone began on December 1, 2004, with 70,293 cases that had not responded to either of the first two mailings by November 24, 2004. Telephone interviewing was conducted 7 days a week (with the exception of December 23, 24, and 31, 2004, and January 1, 2005). RTI trained 178 interviewers for the nonresponse follow-up, including 8 bilingual Spanish-English interviewers.

Based on our analysis of the number of call attempts to get a completed response (Campbell et al., 2004), we increased the number of call attempts for the 2004 survey from 12 attempts to 16 attempts per sample member. RTI obtains telephone numbers for sample members through two sources: the SSA database and commercial telephone matching vendors. Frequently, we obtain two different numbers for a sample member from each of these sources, so we include both numbers in the telephone number sample file. The telephone number file for this survey year contained telephone numbers for 70,293 sample members. If a case had two telephone numbers associated with it, the interviewers dialed the telephone number received from the SSA first. If after eight attempts at the first number no contact was made, the second number was attempted. This procedure represents a change from 2002, where the RTI-provided number was dialed first because we did not know how the SSA numbers would perform. The change was made in 2003 based on the experience of 2002, where the highest percentage of completed cases was obtained from the SSA number. When contact was made with Spanish-speaking households, the calls were routed to Spanish-speaking interviewers. Initial soft refusals were reinserted in the calling queue and directed to interviewers who specialized in refusal conversion techniques. In 2003 and 2004 (as in 2002), refusals were called back 48 hours after the original attempt, not 5 days later as they were in 2000 and 2001. Interviewers were instructed to contact directory assistance if they called numbers that were disconnected or incorrect. If no new number was provided by directory assistance, the call was recorded as “Disconnected—No Directory Assistance Listing.” These cases were then sent back to RTI for tracing on a flow basis. Cases for which RTI’s Tracing Operations Unit (TOPS) found a correct phone number were returned to the telephone center, where further attempts were made to conduct a telephone interview with the sample member.

4.4.2 Third-Wave Mail Follow-up

A final or third-wave survey package was sent to 3,359 nonrespondents for whom RTI did not have a telephone number. The third-wave mailing was sent approximately 5 weeks after the second-wave mailing to allow for returned surveys from the second wave to be processed. The acquisition of the telephone numbers from SSA helped to reduce the number of cases requiring a third-wave mailing by more than 50 percent between 2001 and 2002 and even further reduced it in 2003. In 2002, 8,342 cases were eligible for the Wave 3 mailing because they had not responded and we did not have a phone number for them, compared with 17,961 cases in 2001. In 2003, only 2,666 cases were eligible for the third wave, a reduction of more than two thirds. However, in 2004 we saw a slight increase of 693 cases in the number of cases eligible for the third-wave mailing. The third-wave mailing was sent using special 2-day delivery, which differed from 2002 only insofar as 2002 used overnight delivery. Use of special delivery was based on the findings of the experiment conducted during 2001, which showed that sample members were 2.7 times more likely to return the completed survey if it was delivered by a

special delivery overnight courier than by U.S. Priority or First-Class mail. In 2003, the third-wave mailing realized a rate of return of completed surveys of 12.7 percent, less than in 2002 (18.6 percent) but more than in 2001 (10.5 percent). In 2004, the third-wave mailing realized a rate of return of 464 completed surveys, or 13.8 percent, which is comparable to the 2003 return rate of 12.7 percent.

4.4.3 Tracing and Locating

RTI used a number of resources to find new address information for beneficiaries who moved and to locate telephone numbers for the sample members. First, the sample file was matched to the U.S. Postal Service NCOA database. This process updated 4,123 sample addresses, or 2.41 percent of the 2004 sample. Only 562 surveys were returned as undeliverable after completion of the 2004 survey. We have seen a steady decline in the number of undeliverable packages returned since the 2000 survey when we received 2,597 packages returned as undeliverable. This number was cut by 50 percent in 2001, when 1,316 packages were returned as undeliverable. The smaller number of undeliverable packages received annually can be attributed to the extended schedule, which allows for better tracing and access to the SSA telephone numbers and thus reduces the number of packages mailed in the third wave.

When the sample file is drawn from the EDB, it does not include telephone numbers, which are critical to success in the telephone follow-up. Therefore, it is necessary to begin the search for telephone numbers as early as possible in the process. In the 2000 and 2001 MFFS, RTI used two outside vendors (Telematch and First Data) and the RTI TOPS unit as resources for telephone numbers. Since 2002, the project team has been able to access additional telephone numbers from the SSA.

The tracing for MFFS is done in an iterative process. In past years, the sample file was first processed through Telematch, a vendor with access to national databases that can match names and addresses with corresponding phone numbers. Cases that were returned without a telephone number were then processed through First Data. The CMS office in Puerto Rico has been instrumental in obtaining telephone numbers for sample members who reside in Puerto Rico and for whom our vendors cannot supply numbers. All remaining cases were sent to TOPS for more extensive case-by-case tracing.

Obtaining the telephone numbers from SSA was the primary reason for the increase in the number of sample member telephone numbers found since 2002. Overall, the 2004 tracing effort produced telephone numbers for 95.7 percent of the sample, which is nearly the same number as in 2003 when we identified numbers for 95.91 percent of the sample.

4.5 Data Collection Results

The response rate among eligible sample members for the 2004 MFFS survey was 66.9 percent, which is 2.4 percent lower than the 69.3 percent response rate achieved during 2003. The response rate varied somewhat by geographic area, but response in each area was sufficient (at least 300 completed cases per geounit) to provide measures of CAHPS composites and ratings for all 277 geounits and for each of the 50 U.S. states, the District of Columbia, Puerto Rico, and the Virgin Islands.

RTI received 544 requests for Spanish language surveys from the 177,450 beneficiaries who had received the English language version of the survey. This number of requests was slightly higher than in 2003, when we received 466 requests for the Spanish survey, but the numbers are so low that the difference is not likely to be significant. As noted earlier, the English version of the survey was sent to all sample members except the 1,200 sample members in Puerto Rico, who each received a Spanish survey package. A total of 1,154 Spanish surveys were completed: 575 by mail and 579 by telephone (inbound or outbound). Of those completing a Spanish survey, 568 (49.22 percent) were known to live in Puerto Rico. The number of completed Spanish surveys was much lower in 2004 than in 2003. However, 2003 was an exceptionally high year with 3,104 Spanish completes: 2,404 by mail and 700 by phone.

The only sample members considered to be ineligible for the survey are those found to be deceased during the data collection period of performance. Eligibility includes all mentally or physically incapacitated individuals and individuals with a known language barrier. For 2004, the deceased accounted for only 2 percent of the sample.

Table 4.2 provides a summary of the results of data collection from 2004 by a number of demographic variables. It also provides a comparison to the response rates among eligibles from 2000 through 2004. In 2004, the response rate among eligibles was lower than in any other year, with the exception of 2000.

It is notable that the percentage of respondents who identified themselves as racially “other or unknown” did not recover from the nearly 25 percent decrease in response realized between 2002 and 2003. Until 2003, the number of respondents categorizing themselves as “other or unknown” race had risen. The response rate among sample members in this category jumped from 49.2 percent in 2000 to 66.5 percent in 2001, rose to 74.2 percent in 2002, then fell to just 50.1 percent in 2003 and 46.9 percent in 2004.

4.6 The Future of the MFFS Survey

The past 5 years of the MFFS survey have demonstrated that the fee-for-service Medicare population is very diverse and that segments of the population are hard to reach. Although response rates increased as many as 8 points over the first 2 survey years, it has been difficult to increase the rates further. We saw a steady increase in response rates over the first 3 years of the survey, largely because of improvements made to the methodology as a result of our rigorous study of ways to improve efficiency and response rates. The overall response rate in 2000 was 63.9 percent, which increased to 68.0 percent in 2001 and further to 70.6 percent in 2002. The slight decline in 2003 to 69.3 percent and the rate for 2004 of 66.9 percent do not seem to indicate a problem with the methodology but rather a natural fluctuation in response. In the future, the MFFS survey team may need to consider boosting the response rates among younger beneficiaries by adding a web component. Internet access and knowledge are increasing among the senior population, and the convenience of completing the survey over the Internet will capture the interest of many sample members who may not respond to the mail survey. In addition, the use of web surveys will cut the cost of conducting the mail survey and allow the program to continue at lower funding levels.

Table 4.2
2004 MFFS survey response rates

	2004 sample		2004 respondents		Response rates among eligibles (%)				
	Count	Percent	Count	Percent	2004	2003	2002	2001	2000
Overall	178,650	100.0	117,102	100.0	66.9	69.3	70.6	68.0	63.9
Telephone status									
No number found	7,756	4.3	4,096	3.5	55.1	62.8	63.2	64.7	56.4
Number found	170,894	95.7	113,006	96.5	67.4	69.5	71.1	69.1	67.5
Gender (EDB)									
Male	77,512	43.4	50,755	43.3	66.9	69.2	70.8	68.5	65.0
Female	101,138	56.6	66,347	56.7	66.9	69.3	70.5	67.7	63.0
Age group (EDB)									
44 or younger	5,070	2.8	2,327	2.0	46.3	46.5	50.3	56.8 ^a	51.3 ^a
45-64	18,387	10.3	10,829	9.2	59.7	61.8	63.9		
65-69	39,467	22.1	26,958	23.0	68.9	71.2	73.1	70.0	67.7
70-74	37,500	21.0	26,169	22.3	70.6	72.7	74.7	71.8	69.1
75-79	32,840	18.4	22,852	19.5	70.9	72.9	73.8	71.2	67.8
80-84	24,682	13.8	16,376	14.0	68.4	71.1	71.1	69.9	
85 or older	20,704	11.6	11,591	9.9	59.5	62.8	62.9	60.7	59.5 ^b
Race (EDB)									
White	153,796	86.1	104,245	89.0	69.1	71.3	71.5	69.4	66.0
Black	16,461	9.2	9,014	7.7	56.2	59.1	59.1	55.6	51.0
Other	8,393	4.7	3,843	3.3	46.9	50.1	74.2	66.5	49.2
Dually eligible (EDB)									
Yes	24,778	13.9	13,698	11.7	57.2	60.5	61.3	56.9	50.5
No	153,872	86.1	103,404	88.3	68.4	70.6	72.0	69.6	66.1
Beale code ^c									
Central metro counties 1M+ pop	54,712	31.0	32,686	28.2	61.1	64.0	64.7	61.8	58.4
Fringe metro counties 1M+ pop	6,477	3.7	4,371	3.8	68.8	70.3	72.6	70.1	65.9
Metro counties of 250K to 1M+ pop	42,148	23.8	27,864	24.0	67.5	69.3	70.5	68.7	63.5
Metro counties of <250K pop	19,506	11.0	13,450	11.6	70.4	72.3	74.3	71.3	67.4
Urban pop of 20K +, adjacent to metro area	9,241	5.2	6,443	5.5	70.9	71.8	74.2	70.9	68.1
Urban pop of 20K +, not adjacent to metro area	6,365	3.6	4,415	3.8	70.6	73.2	75.5	72.6	67.0

(continued)

Table 4.2
(continued)

	2004 sample		2004 respondents		Response rates among eligibles (%)				
	Count	Percent	Count	Percent	2004	2003	2002	2001	2000
Urban pop of 2,500 to 19,999, adjacent to metro area	16,325	9.2	11,399	9.8	71.3	73.6	74.7	72.0	68.4
Urban pop of 2,500 to 19,999, not adjacent to metro area	14,386	8.1	10,180	8.8	72.1	75.1	76.1	73.8	68.9
Completely rural, adjacent to metro area	2,642	1.5	1,884	1.6	72.8	74.4	76.2	72.6	69.2
Completely rural, not adjacent to metro area	4,835	2.7	3,418	2.9	72.1	75.8	77.6	74.9	70.1
Census division									
New England	12,532	7.0	8,169	7.0	66.7	68.5	69.8	67.5	62.7
Middle Atlantic	22,984	12.9	13,739	11.7	61.1	63.8	64.8	62.8	59.7
East South Central	14,116	7.9	9,547	8.2	69.0	71.1	72.1	70.8	64.9
West South Central	17,720	9.9	11,642	9.9	67.2	69.4	70.3	66.0	63.8
South Atlantic	36,750	20.6	23,748	20.3	66.0	68.6	70.6	67.7	63.9
East North Central	27,596	15.4	18,802	16.1	69.4	71.8	72.9	70.7	65.9
West North Central	17,357	9.7	12,506	10.7	73.5	74.9	76.4	74.7	70.5
Pacific	16,515	9.2	10,253	8.8	63.4	66.4	68.1	64.4	61.9
Mountain	11,180	6.3	7,772	6.6	70.6	73.0	73.8	72.5	67.4
Puerto Rico and Virgin Islands ^d	1,900	1.1	924	0.8	49.3	54.2	59.2	57.5	45.6

^a In the 2000 and 2001 MFFS surveys, beneficiaries aged 64 or younger comprised the youngest age category available as a response to the question, “What is your age now?” Beginning in 2002, this age category was further broken out into responses for beneficiaries aged 44 or younger and beneficiaries aged 45 to 64.

^b In the 2000 survey, beneficiaries aged 80 or older comprised the oldest age category available as a response to the question, “What is your age now?” Beginning in 2001, this age category was further broken out into responses for beneficiaries aged 80 to 84 and beneficiaries aged 85 or older.

^c Puerto Rico and Virgin Islands have been excluded from percentage calculations because Beale codes are not assigned in these regions.

^d Virgin Islands included in the 2003 sample only.

NOTE: EDB = CMS Enrollment Database.

SECTION 5

USING THE MINIMUM DATA SET (MDS) TO IDENTIFY THE INSTITUTIONALIZED IN THE MEDICARE FEE-FOR-SERVICE POPULATION

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The institutionalized status of Medicare fee-for-service (MFFS) beneficiaries cannot be determined from the CMS Enrollment Database (EDB), which is the sampling frame for the CAHPS[®] MFFS survey. By contrast, Medicare Advantage (MA) beneficiaries with a current Medicare source of payment for a nursing home stay (available on the Group Health Plan [GHP] master file) are excluded from the MA sampling frame. (MFFS beneficiaries are not included on the GHP.) As a result, we do not know prior to data collection how many MFFS beneficiaries are institutionalized when we draw the MFFS sample, nor can we calculate MFFS response rates for the institutionalized subpopulation when data collection is complete.

MFFS beneficiaries who respond to the survey and indicate that they are institutionalized (i.e., currently living in a long-term care facility) are excluded from analyses comparing CAHPS scores between MFFS and MA beneficiaries but are included in MFFS-only analyses. The MA and MFFS comparisons in 2000 through 2002 yielded significant differences in certain CAHPS indicators at the national level. Although these differences are not entirely explained by the presence of the institutionalized in the MFFS respondent file, there are two hypotheses we wish to examine. First, the survey methodology used for the MFFS survey (mail with telephone follow-up) results in low response rates among institutionalized beneficiaries. In this analysis of institutionalized and noninstitutionalized MFFS beneficiaries, we investigated whether identifying institutionalized sample members from among survey nonrespondents (and removing them from the denominator of response rate calculations) yields higher overall response rates in the CAHPS MFFS surveys. Second, most institutionalized beneficiaries have distinctly different experiences with Medicare than do community-based beneficiaries. Using respondent files from the 2000 through 2002 MFFS surveys, we investigated whether CAHPS scores for beneficiaries determined to be institutionalized (via their responses to the survey and via the Long-Term-Care Minimum Data Set [MDS]) were significantly lower than those of beneficiaries who were not found to have been institutionalized during the study period.

Because the EDB does not provide the institutionalized status of MFFS beneficiaries, we looked to other means of identifying the institutionalized among our sample members, including using the representative payee flag as a proxy for institutionalization in the 2000 MFFS and using the survey response to current living arrangement in all 3 years of our analysis. The results, discussed in Sections 5.4.2 and 5.4.3, show that these two methods do not adequately identify institutionalized MFFS beneficiaries. In Section 5.1, we present the MDS as a viable alternative for constructing a variable that identifies the institutionalized among the MFFS sample. In Section 5.2, we describe how we merged the information from the MDS with the MFFS sample data, and in Section 5.3, we discuss how we created a variable that identifies MFFS sample members who had a nursing home stay before, during, and after data collection in survey years 2000 through 2002. Finally, in Section 5.4, we provide descriptive analyses of the demographic characteristics of institutionalized and noninstitutionalized MFFS beneficiaries, and we compare the response rates and CAHPS measures of those who had a stay before, during, or after data collection with those who did not have an institutionalized stay during the period of study.

5.1 Minimum Data Set (MDS)

The MDS is a standardized, primary screening and health status assessment tool that forms the foundation of the comprehensive assessment for all residents of long-term care facilities certified to participate in Medicare or Medicaid. The MDS contains items that measure physical, psychological, and psychosocial functioning and provides a multidimensional view of the patient's functional capacities. The general categories of data and health status items in the MDS include demographics and patient history, cognitive functioning, communication/hearing, vision, mood/behavior patterns, psychosocial well-being, physical functioning, continence, disease diagnoses, health conditions, medications, nutritional and dental status, skin condition, activity patterns, special treatments and procedures, and discharge potential. MDS data from CMS are available starting in June 1998, although CMS does not recommend using MDS data from before October 1998.

We acquired an extract of the November 1, 2003, MDS for institutionalized CAHPS MFPS sample members selected for the 2000, 2001, and 2002 surveys. The effective date of this extract is August 1, 2003, which reflects a 3-month delay in receiving information from states. The MDS extract contains 594 variables¹ and 414,890 distinct assessments for 54,417 CAHPS MFPS sample members who had a nursing home stay between October 1998 (the recommended starting point for MDS data) and April 30 of the year the sample member was selected for the survey.

During a nursing home stay, periodic assessments of health status are done for every resident. In particular, assessments are administered within 14 days of admission, on a quarterly and annual basis, whenever the resident experiences a significant change in status, and whenever the facility identifies a significant error in a prior assessment. A final assessment is done at discharge. Residents receiving reimbursement from the Medicare skilled nursing facility prospective payment system require more frequent assessments (i.e., every 5, 14, 30, or 60 days).

5.2 Data Preparation

RTI created a "finder" file of the 2000 through 2002 MFPS sample members, which included information about each MFPS sample member that could be used to obtain the MDS assessments (if any) for that sample member. The health insurance claim (HIC) number (*HICN*) was used to uniquely identify each sample member. The finder file was matched with the MDS, and assessments were extracted for all sample members found to have records in the MDS. (Fu Associates, a CMS contractor, performed the matching and extraction.) The results of the matching and extraction are contained in two SAS data sets, named *MDSID* and *MDS_RETURN*.

The *MDSID* file is the crosswalk that links beneficiaries on the MFPS finder file created by RTI to the MDS assessments file provided by CMS. The *MDSID* file contains the MFPS *HICN* and two variables from the MDS: *state_cd* (two-letter state abbreviation) and *resident* (MDS resident internal identifier). It is a person-level file, where each record represents a unique cross of the *state_cd* and *resident* variables and is associated with a unique person in the MDS.

¹ The MDS codebook can be found at <http://cms.hhs.gov/medicaid/mds20/rai1202ch3.pdf>.

The MDSID file contains only the MFFS sample members who were found to have had MDS assessments in the period of interest.

The MDS_RETURN file contains records for all assessments of all MFFS sample members who had MDS assessments during the period of analysis from October 1998 to August 2003. Each record refers to an assessment, and each person may have one or more assessments and one or more stays in a nursing home during the analysis period. For instance, a person who has had one nursing home stay with three assessments (initial assessment, first quarter assessment, and discharge assessment) has three records on the MDS_RETURN file. Similarly, a person with two nursing home stays—spanning three and six assessments, respectively—will have a total of nine records on the file. The variable *amnt_in* (assessment internal ID) uniquely identifies an assessment within each *state_cd*. The MDSID and MDS_RETURN data sets are linked by the unique combination of *state_cd* and *resident* variables on each file to create a combined data set, which can then be linked to the MFFS finder file via *HICN*.

We encountered several difficulties in our initial attempts to link our MFFS finder file with the merged MDSID and MDS_RETURN data sets. The MDSID file has 177,066 records. The MDS_RETURN file has 756,404 records, with 92,579 unique combinations of *state_cd* and *resident*. These 92,579 combinations matched 92,579 of the 177,066 records in the MDSID file, but the remaining 84,487 cases in the MDSID file did not appear to match up with any record in the MDS_RETURN file. One possible explanation for this discrepancy is that the resident table that CMS uses to extract MDS data contains information not only on persons who have MDS data but also on persons who have data from the Outcome Assessment Information Set (OASIS), which is an assessment of patients of home health care agencies. A frequency analysis of the type of assessment indicator found that 83,425 persons (among all those identified to have records during the analysis period) were listed as having only OASIS data. Therefore, the 84,487 cases in the MDSID file with no MDS_RETURN data may, in fact, be MFFS sample members who appear in the CMS database because they have OASIS data but not MDS data. If this is the case, then these sample members would be considered noninstitutionalized. We investigated this possibility further by attempting to match the MDS files with the MFFS finder file.

Complications arose in matching the MDSID and MDS_RETURN data sets with the MFFS finder file using *HICN*. There is not a one-to-one match between *HICN* and the *state_cd* by *resident* combination. In fact, there were cases of more than one *HICN* in the MFFS file matching with a unique *state_cd* by *resident* combination, one *HICN* in the MFFS file matching with more than one *state_cd* by *resident* combination, and *state_cd* by *resident* combinations not matching with any *HICN* from the MFFS file. Moreover, though a *HICN* uniquely identifies a beneficiary at any given moment, a *HICN* can change over time depending on such events as the death of a spouse or remarriage. Similarly, if beneficiaries in a nursing home move to a different state, their *state_cd* by *resident* identifier changes as well. Given the above, we began to suspect that there were prior or more recent *HICNs* on the MDS files than in the MFFS finder file we generated, since the *HICNs* in the MFFS file are the ones on record at the time the sample was pulled from the EDB.

We eventually found success merging the MDS and MFFS finder files by using additional information made available to us by CMS, which maintains a cross-reference of all *HICNs* assigned to a beneficiary. In particular, we cross-referenced the *HICNs* from the MFFS

finder file to obtain the latest *HICN* for each beneficiary on the MDS files. A *HICN* cross-reference data set was created and used to update the MFFS finder file and the MDSID file. We matched the MFFS file to MDSID using the MFFS *HICN*. The updated MDSID was then matched to the MDS_RETURN file using *state_cd* and *resident*, resulting in a file called RETURN_FINAL. Finally, we matched the MFFS finder file to RETURN_FINAL using the latest *HICN*, creating an updated version of MDS that is linkable to the MFFS analysis data sets via *HICN*.

This linkable MDS data set is still an assessment-level data set, which we collapsed into a stay-level data set by creating one record for all assessments done during one stay. We then created a person-level data set from the stay-level data set by aggregating the stays for one person into one record. We constructed the institutionalized status variable, *mdsinst*, by examining each person’s stays and aggregating them according to the steps discussed in Section 5.3. Analyses of the MFFS data were then conducted using this person-level data set and the institutionalized status variable, *mdsinst*.

5.3 Variable Construction Methods

For our analysis, we determined the institutionalized status of all MFFS sample members (nonrespondents as well as respondents) before, during, and after data collection, based on the presence or absence of a nursing home assessment on the MDS_RETURN file. We defined the data collection period to be the 4- to 5-month period between the initial mailing of Wave 1 questionnaires during each survey year and the last date that completed surveys (returned via U.S. Mail or completed by phone) were accepted for inclusion in our respondent files. These dates are referred to as “fence dates” in the discussion that follows.

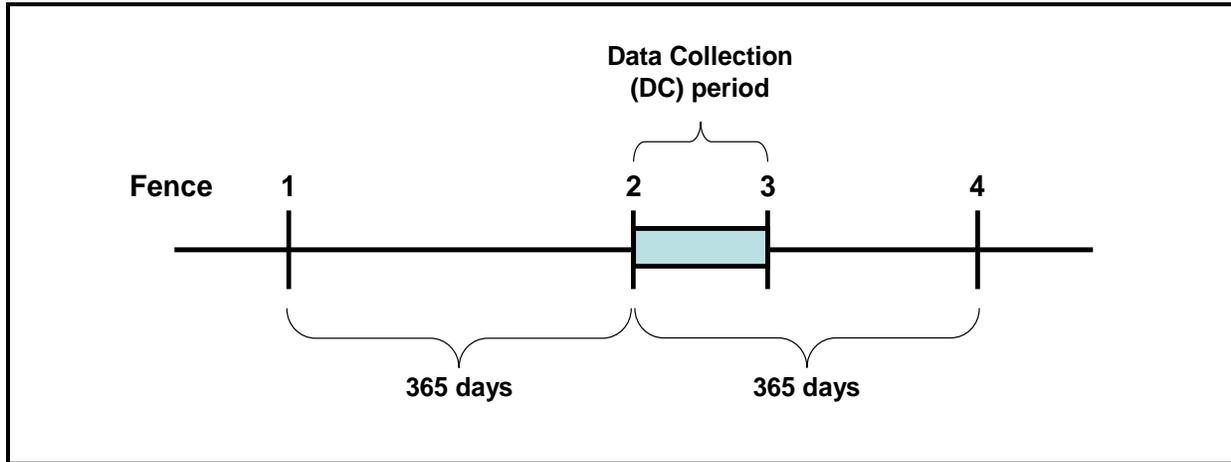
Table 5.1 identifies the specific fence dates in each survey year, 2000 through 2002. For example, the beginning of data collection in 2000 was October 9, 2000 (Fence 2), and the end of data collection for that year’s survey was February 1, 2001 (Fence 3). Fence 1 represents the date exactly 1 year prior to the start of data collection (October 9, 1999), and Fence 4 (October 9, 2001) represents the date exactly 1 year after the start of data collection in the 2000 survey year. The fence dates for the 2001 and 2002 MFFS surveys may be interpreted in the same way.

Table 5.1
Fence dates for the 2000 through 2002 CAHPS MFFS surveys

Year	Fence 1 date	Fence 2 date	Fence 3 date	Fence 4 date
2000	Oct. 9, 1999	Oct. 9, 2000	Feb. 1, 2001	Oct. 9, 2001
2001	Sept. 14, 2000	Sept. 14, 2001	Feb. 1, 2002	Sept. 14, 2002
2002	Sept. 13, 2001	Sept. 13, 2002	Feb. 7, 2003	Sept. 13, 2003

Figure 5.1 provides a graphic illustration of the MFFS fence dates. Readers may wish to refer to this figure during our detailed discussions of the construction of the institutionalized status variable, *mdsinst*, beginning in Section 5.3.2.

Figure 5.1
Framework for the construction of the institutionalized status variable, *mdsinst*



5.3.1 DOA (Date of Admission) and DOD (Date of Discharge) variables

The institutionalized status variable, *mdsinst*, relies on valid start and end dates for proper and consistent categorization of visits. Using the assessment-level files from each year of the analysis, we constructed *doa* and *dod* variables to define the date of admission and the date of discharge, respectively, for each institutionalized stay. We assigned *doa* the variable *ablimp*, the imputed date of entry provided by Fu Associates, except for two cases in which *ablimp* was missing for all assessments in that stay. For these cases, we used other supplied date variables to assign *doa*. One was set to 14 days prior to *a3a*, the last day of the MDS observation period, and the other was set to 14 days prior to *r4*, the date of death or discharge. We assigned *dod* the value of *r4* unless this variable was missing. If *r4* was missing for the most recent visit on file, then we assumed that the individual was still institutionalized, and *dod* was set to August 1, 2003, the date on which the MDS file was pulled. If *r4* was missing and there were subsequent stays, then we set *dod* for that stay to the next stay’s date of arrival. About 20 percent of those institutionalized were missing *r4* for at least one visit. We then collapsed the files to person-level analysis files with potentially multiple institutionalized stays associated with a particular beneficiary.

5.3.2 MDSINST Analysis Variable

We used the MDS assessment dates, our fence dates in each survey year, and the date of admission (*doa*) and date of discharge (*dod*) variables described above to group sample members into the following five categories of institutionalization:

1. **Not institutionalized:** Sample members who did not have a stay on record between October 1998 and August 2003, the valid dates of record on the MDS_RETURN file for MFFS beneficiary institutionalizations
2. **More than 1 year before or after data collection:** Sample members who did not have a stay during the data collection period in a given survey year but who had a

- prior stay(s) that ended before the Fence 1 date or a subsequent stay(s) that began after the Fence 4 date that year
3. **Up to 1 year prior to start of data collection:** Sample members who had an assessment within 365 days prior to the start of the data collection period but not during the data collection period in a given survey year (between Fence 1 and Fence 2)
 4. **Up to 1 year after start of data collection:** Sample members who had an assessment within 365 days after the start of the data collection period but not during the data collection period in a given survey year (between Fence 3 and Fence 4)
 5. **During data collection:** Sample members who had at least one assessment during the data collection period in a given year (between Fence 2 and Fence 3)

Each of the more than 523,000 sample members (spanning all 3 years of our analysis) was assigned to only one of these five *mdsinst* categories, even if the individual had multiple institutionalized stays. If any stay occurred during data collection, then the individual was assigned to Group 5, regardless of the timing of other institutional stays. If an individual had no stays during data collection but had a stay within the year of data collection, that beneficiary was assigned to either Group 3 or Group 4, depending on the date of the stay. If the beneficiary did not have a stay within a year of data collection but had a stay on the file, then the beneficiary was assigned to Group 2. Finally, if there were no stays at all, the beneficiary was assigned to Group 1.

It should be noted that 960 individuals required an additional coding step to ensure that mutually exclusive categories would be created. These 960 beneficiaries had an institutional stay within the year prior to data collection and an institutional stay within the year after the data collection period but had no stay during data collection in a given survey year. Consequently, there was some question as to whether to assign these cases to the “Up to 1 year prior to data collection” (Group 3) or “Up to 1 year after data collection” (Group 4) categories.

To resolve this issue, we determined the length of time between the last *dod* and the beginning of data collection and the length of time between the first *doa* and the conclusion of data collection for each of these 960 cases in their respective survey years. The minimum of these two lengths dictated where that beneficiary would be classified. For example, if a beneficiary in the 2002 survey had a *dod* of September 10, 2002 (i.e., 3 days before the start of data collection that year) and a *doa* of February 16, 2003 (i.e., 9 days after the end of data collection in that survey year), this individual would be categorized in Group 3 as having been institutionalized “Up to 1 year prior to data collection.”

5.4 Analysis and Discussion

In each survey year of our analysis, between 11 and 17 percent of CAHPS MFFS sample members (respondents and nonrespondents) had at least one stay in a nursing home between October 1998, the starting point for MDS data, and August 2003, the effective date of our extract. Using our constructed variable based on the MDS, we found that between 4.5 and 5.5 percent of all CAHPS MFFS sample members had a stay during the data collection period in

each year. This figure compares favorably to the 4.7 percent institutionalization rate among the total U.S. population aged 65 or older found by the Census in April 2000. (Also see Sections 5.4.4 and 5.4.5 of this report for further discussion concerning the response rates of MFFS beneficiaries using the MDS file match and the potential effect of institutionalization on CAHPS measures, respectively.)

5.4.1 Demographic Characteristics of the MFFS Institutionalized Subpopulation

Using the MFFS respondent files, we generated cross-frequencies of our MDS-constructed institutionalized variable with various demographic variables¹ to identify any deviations from the overall sample characteristics in the 2000 through 2002 CAHPS MFFS survey years among those beneficiaries whom we identified as having been institutionalized before, during, or after data collection in those years. *Tables E.1 through E.3* in *Appendix E* present highlights of our findings with respect to age, gender, and general health perception.

In each of the 3 years of our analysis, beneficiaries in Groups 2 through 5 (i.e., those who had at least one institutionalization on record between October 1998 and August 2003) tended to be older than those who did not have an institutionalization in the same time period. *Appendix Table E.1* shows that nearly 80 percent of MFFS beneficiaries in 2000 through 2002 whom we identified as having been institutionalized during data collection (Group 5) were 75 years of age or older. Even among beneficiaries who were institutionalized outside of the data collection period in each year (Groups 2 through 4), approximately 7 in 10 were 75 years of age or older. By contrast, only 40 percent of those found not to have been institutionalized at all (Group 1) were in this age bracket.

With respect to gender, our findings were consistent across each of the 3 years. In general, females represent a modest majority (57 percent vs. 43 percent) of our overall samples in each year relative to males, and this proportion is maintained when looking at those who were not institutionalized at all (Group 1). However, among beneficiaries who had at least one record of institutionalization between October 1998 and August 2003 (Groups 2 through 5), females made up almost two-thirds of the respondents. This is consistent with our earlier finding about the age distribution of institutionalized and noninstitutionalized beneficiaries, given that females tend to live longer than males. In other words, we would expect to see more females among the more elderly, institutionalized population, as these data suggest.

Finally, with respect to self-reported general health perception, beneficiaries who had at least one institutionalization during the period of study tended to rate their general health “fair” or “poor” at higher proportions than did beneficiaries who had no institutionalizations at all. In particular, slightly more than three-quarters of beneficiaries who were identified as having been institutionalized during data collection (Group 5) in 2000 rated their general health “fair” or “poor,” compared with nearly 70 percent in 2001 and 68 percent in 2002. The proportions of beneficiaries in Groups 2 through 4 (i.e., those who were institutionalized outside of the data

¹ The demographic variables in our analysis included 5-category age (<65, 65-69, 70-74, 75-79, and 80+); 7-category race (White, Black, Asian, Hawaiian/Pacific Islander, American Indian, EDB Other/Indeterminate, and Hispanic); gender (male, female); disabled status (not disabled, disabled); proxy (help, no help); answer proxy (yes, no); and 5-category general health perception (excellent, very good, good, fair, poor).

collection periods) in each of the survey years who self-reported fair or poor general health were slightly lower than those who were institutionalized during data collection in those years, ranging from 47 to 63 percent of respondents in those categories of institutionalization. By contrast, only 3 in 10 beneficiaries who had no institutionalizations in the October 1998 to August 2003 time period also self-reported that they were in fair or poor health.

In general, institutionalized beneficiaries whom we identified using the MDS tended to be older females who self-reported that they were in fair or poor general health.

5.4.2 Using the Representative Payee Flag as a Proxy for Institutionalization

For the initial (2000) MFSS survey, the response rate among persons with a representative payee was 36 percent, well below the overall response rate of 64 percent that year. Because of the low response rate and because many persons with a representative payee are institutionalized, CMS decided to exclude them from subsequent CAHPS MFSS surveys. *Appendix Table E.4* shows the distribution of sample members who had representative payees in 2000 and their institutionalized status. (Note that the institutionalized status was created using the MDS data, as described in Section 5.3.)

Appendix Table E.4 shows that about 80 percent of sample members who had a nursing home stay during the data collection period, and almost all sample members who had a nursing home stay outside the data collection period, did not have a representative payee. Therefore, we determined that having a representative payee was not an effective proxy for accurately defining an institutionalized MFSS beneficiary.

5.4.3 Using the Survey Response to Current Living Arrangement to Determine Institutionalized Status

The 2000 through 2002 MFSS surveys ask what best describes the respondent's current living arrangements. Selecting "Long-term care facility" is deemed to be an indication of being institutionalized during the data collection period. *Appendix Tables E.5 through E.7* show the percentage of respondents who self-reported that they were living in a long-term care facility (%LTC) at the time of data collection. In each year of our analysis, only 2 percent of the respondents would be considered institutionalized during the data collection period using the survey response to this question. Compared with the institutionalized status variable created using the MDS, we found that 50 percent or fewer of the respondents deemed institutionalized during data collection by the MDS were deemed as such by the survey response. For instance, only 50.2 percent of the respondents determined to be institutionalized during the 2000 data collection period reported that they were currently living in a long-term care facility. The corresponding rates in 2001 and 2002 are lower. This finding may be the result of using a definition of institutionalization (from the MDS) that does not distinguish between short-term stayers and long-term stayers.

5.4.4 Analysis of Response Rates Among the Institutionalized

Appendix Tables E.5 through E.7 show the response rates for each of the categories of institutionalized status we determined using the MDS. For all 3 years, the members who had a nursing home stay at any time during the data collection period had the lowest response rates,

much lower than those of the other groups. Response rates for 2001 and 2002 were more than 20 percent below the overall rate average if the stay occurred during data collection. However, response rates were only slightly lower than the overall rate if the stay occurred outside of the data collection period. Response rates for the 2000 survey were even more affected by institutionalization but were also affected by the inclusion of representative payees.

If sample members who had a stay during data collection are retrospectively deemed ineligible for the MFFS survey, the response rates in each year increase only slightly, with the highest increase of 1.5 percent observed in 2000 (see *Appendix Tables E.5 through E.7*). It bears repeating, however, that we did not distinguish between short- and long-term stayers in the current analysis. Consequently, the observed differences in response rates should be considered an upper bound, in that persons with both short and long stays during data collection are excluded. If only persons with a long stay are excluded, the impact on response rates will be diminished. Thus, it appears that excluding sample members who were institutionalized during data collection does not significantly improve MFFS survey response rates.

Sample members with a nursing home stay are slightly more likely to answer by phone than those with no stays. This difference may be because members who have stays are more likely to be in the telephone follow-up wave of data collection rather than because they have a preference for responding by phone.

About two-thirds of respondents who had a stay during data collection answered by proxy. Even respondents who had at least one stay outside the data collection period were twice as likely to need a proxy as those without a stay.

Over 20 percent of the sample members for the 2001 and 2002 surveys who had a stay during data collection, and over 17 percent of the sample members for the 2000 through 2002 surveys who had a stay in the year prior to data collection, died at some point during the data collection period. Except for a few who responded, these members were considered ineligible for the survey.

5.4.5 CAHPS Measures by Institutionalized Status

We calculated CAHPS ratings and composites for each institutionalized subgroup using the CAHPS 3.4 Survey and Reporting Kit macros (see www.cahps-sun.org for more information). The CAHPS macro enables us to report on both means and proportions, as well as to determine the level of aggregation. *Appendix Table E.8* presents the weighted and case-mix adjusted proportions by self-reported (i.e., survey) institutionalized status at the national level for the most-positive CAHPS ratings and responses (i.e., “10,” “Always,” “Not a problem,” or “Yes”). *Appendix Table E.9* presents the corresponding proportions by MDS institutionalized status. Variables making up the case-mix model included age, education, self-reported health, self-reported mental health, and proxy.

We used the two-sample t-test for differences in proportions to make pairwise comparisons. Our sample sizes for all groups of interest exceed the usual rules of thumb for large sample tests; thus, by the Central Limit Theorem, the normal approximation to the binomial distribution was used to make the pairwise comparisons. We held the family-wise error rate at $\alpha = .05$ and accounted for multiple comparisons using Bonferroni’s adjustment. Because we

did not specify a direction in making the comparisons, we used two-tailed probabilities. We compared each institutionalized category with those who were noninstitutionalized in the period of study for each CAHPS rating and composite, within each of the 3 years. We also compared the CAHPS measures of those who were institutionalized during data collection to all other categories of institutionalization, for all indicators within each year.

Appendix Tables E.8 and E.9 summarize the results of our analysis, using our survey-constructed and MDS-constructed definitions of institutionalization, respectively. In general, within each year of our analysis, beneficiaries reported a substantially greater degree of satisfaction with the Needed Care composite (and moderately greater degrees of satisfaction with the Care Quickly and Good Communication composites) than with their overall ratings of Medicare and of the quality of health care they received. This observation is consistent across all 3 years of the study.

Our initial analysis of the effect of institutionalization on CAHPS scores (see *Appendix Table E.8*) used the survey-constructed institutionalized variable. We determined that significant differences exist in the proportions of institutionalized and noninstitutionalized beneficiaries reporting the most-positive experience with three of the five CAHPS indicators—Good Communication, Rate Care, and Rate Plan (the only exception being the 2001 rating of Medicare). In each of these cases, the proportion of beneficiaries who gave the most-positive response among those who self-reported that their current living arrangement was a long-term care facility was lower than the corresponding proportion of beneficiaries who were not currently living in such a facility.

It should be noted that not all survey respondents were included in these initial CAHPS runs because of item missingness for the survey question about current living arrangement. (Please refer to the footnotes to *Appendix Table E.8*.) For example, in the 2000 MFFS, 6,197 respondents did not provide answers to this question; in 2001, 20,589 respondents did not respond to this question; and in 2002, 6,752 respondents did not answer this question. We performed a cross-tabulation of the survey institutionalized variable and our 5-level institutionalized variable constructed via the MDS. The majority—81.1 percent, 85.0 percent, and 86.9 percent in 2000, 2001, and 2002, respectively—of those who did not provide responses to this question on the survey could, in fact, be identified as never having been institutionalized using the MDS. However, using our revised categorization, we determined that 1,174 respondents in the 2000 MFFS did not provide answers to the current living arrangement question on the survey but had been institutionalized at least once (i.e., belonged in one of Groups 2 through 5) in the timeframe of our study. (The numbers of such respondents in 2001 and 2002 were 3,085 and 883, respectively.) This finding serves as further justification for a more refined definition of institutionalization using the MDS.

Appendix Table E.9 shows the results of disaggregating the categories of institutionalization further using the MDS to match the five mutually exclusive groups described in Section 5.3.2. Our findings indicate that—similar to results presented in *Appendix Table E.8*—Good Communication, Rate Care, and Rate Plan were the indicators with the most significant differences in proportions of the CAHPS measures included in our analysis. The lowest-rating subpopulation of institutionalized beneficiaries in 2000 through 2002, for each of these CAHPS indicators, was the group that was institutionalized during data collection

(Group 5). By contrast, the highest proportions of beneficiaries reporting the most-positive response to these three CAHPS indicators were those who were institutionalized more than a year before or after data collection (Group 2) in 2000 and those who were institutionalized in the year after data collection (Group 4) in 2001 and 2002.

With respect to statistically significant differences in proportions of institutionalized beneficiaries providing the most-positive response to the CAHPS indicators in comparison to those who were not institutionalized, 86.9 percent of those who were institutionalized more than a year before or after data collection (Group 2) in 2000 were highly satisfied with the Needed Care composite, in comparison to 85.5 percent of those who were not (Group 1) during the same period. No other pairwise tests for differences in proportions between institutionalized groups for the Needed Care composite were statistically significant at the $\alpha = .05$ level.

Both statistical and practical significance are very much at play, however, in our findings with respect to the Good Communication composite and to the two CAHPS ratings. Across these three CAHPS indicators, the proportions of beneficiaries who were institutionalized during data collection (Group 5) in 2000 through 2002 are significantly lower¹ than those of beneficiaries who were not institutionalized (Group 1) at all, and for the most part, the differences in proportions are quite pronounced. For example, only 37 percent of Group 5 beneficiaries in 2000 rated their care a “10,” compared with nearly 47 percent of Group 1 beneficiaries that same year. Across these three CAHPS measures, absolute differences in proportions were largest in 2000. For example, the 9.5-percentage-point difference in proportions for the Rate Care indicator in 2000 between these same two institutionalized groups decreased to just under 5 percent in 2001 and 4 percent in 2002.

Appendix Table E.9 also presents the results of our pairwise comparisons of the proportions of beneficiaries who were institutionalized outside of data collection (Groups 2 through 4) to those who were institutionalized during data collection (Group 5) in each year. For all three CAHPS indicators (Good Communication, Rate Care, and Rate Plan) in each of the 3 years, the proportion of beneficiaries in Group 2 (i.e., those who were institutionalized more than a year before or after data collection) who reported the most-positive response was significantly higher than that of beneficiaries in Group 5. In addition, with respect to the two CAHPS ratings, the proportion of beneficiaries who were institutionalized within the year after data collection (Group 4) and gave the most-positive response to the two ratings questions was significantly higher than that of beneficiaries who were institutionalized during data collection.

5.5 Recommendations for Future Analyses

Investigating the institutionalized status of MFFS beneficiaries using the MDS file has enabled us to explore differences in CAHPS scores and response rates between beneficiaries with a nursing home stay before, during, and after data collection and those with no nursing home stay. To continue this work, we recommend two sets of future analyses. The first set would expand the analysis started with the *mdsinst* variable using logistic regression models. The

¹ The proportions of Group 1 versus Group 5 beneficiaries reporting the most-positive response to their ratings of Medicare were not significantly different in 2001 and 2002.

second set would explore the effects of how long a beneficiary was institutionalized (i.e., length of stay) on response rates and CAHPS scores.

5.5.1 Modeling the Effects of the *MDSINST* Variable on Response Rates

The preliminary analysis of the *mdsinst* variable revealed that response rates were the lowest among beneficiaries with a nursing home stay at any time during data collection. Using logistic regression models, we recommend formally testing to see if the response propensity is significantly lower for this group when demographic characteristics such as age, gender, race, and representative payee (in the case of the 2000 MFFS) are included in the model as covariates. We also recommend including the interaction between *mdsinst* and the covariates in the model to see if response propensity depends on both nursing home stays and beneficiary characteristics. Understanding this interaction, if one exists, may enable researchers to tease out the true effects of being institutionalized on response rates.

5.5.2 Creating a Length of Stay Variable and Modeling the Effects on Response Rates and the CAHPS Measures

As previously noted, the *mdsinst* variable does not take into consideration the total number of days a beneficiary was institutionalized. We recommend, therefore, creating a length of stay variable that would enable researchers to further examine differences in response rates and CAHPS scores as the length of a nursing home stay increases.

The first step in such an analysis would be to create a length of stay variable. Nursing home stays can be continuous (one stay for many days) or broken into many shorter stays. Creating a length of stay variable would involve both types of nursing home stays. We recommend beginning with an investigation of the number of days a beneficiary is institutionalized during data collection, before data collection, and after data collection, followed by an investigation of the total number of nursing home stays. Then, based on the results of the types of nursing home stays, we recommend combining the two measures and creating a single variable that would summarize the amount of time a beneficiary spent in a nursing home before, during, and after data collection. For best results, we recommend categorizing the variable into long, medium, and short lengths of stays.

Finally, upon creating the length of stay variable, we recommend investigating differences in response rates and CAHPS scores through descriptive statistics followed by regression analyses driven by the results of the descriptive statistics.

SECTION 6 CASE-MIX ADJUSTMENT

by Marc N. Elliott, Ph.D., RAND

The Medicare CAHPS[®] Fee-for-Service (MFFS) Survey is centered around two types of comparisons: (1) beneficiary comparisons of MFFS and Medicare Advantage (MA, formerly Medicare Managed Care) within local areas and (2) administrative comparisons of MFFS across local areas. Case-mix adjustment (CMA) is a central element in these comparisons. Section 6 provides a discussion of CMA for the 2004 MFFS survey.

From ratings and reports of care, CMA attempts to remove response patterns that are systematically associated with such patient-level characteristics as demographics, socioeconomic status, and general health status, which may vary considerably across reporting units. These systematic patterns of association may reflect “response bias”—response patterns that do not correspond to actual differences in quality of care. In any event, these are patient characteristics that are generally agreed to be beyond the control of providers or plans once they have been selected by beneficiaries. The goal of CMA can therefore be thought of as follows: to estimate the ratings and reports that a plan or collection of MFFS providers would have received if all providers and plans treated the same standardized population of patients (Medicare beneficiaries). This adjustment should make attributions of ratings and reports to MFFS providers and MA plans more appropriate, supporting better decision making by beneficiaries and quality improvement by CMS and Quality Improvement Organizations (QIOs).

6.1 Approach

In this report, CMA involves linear regression models with global ratings and reports of care serving as dependent variables and with beneficiary-level characteristics serving as independent variables (case-mix adjusters).¹ As noted in the 2000 MA CMA report (Cioffi et al., 2001), this model can be described as follows for a single outcome i :

$$y_{ipj} = \beta_i' x_{ipj} + \mu_{ip} + \varepsilon_{ipj}$$

where y_{ipj} represents the response to [outcome] i of respondent j from [reporting entity] p ..., β_i is a regression coefficient vector, x_{ipj} is a covariate vector ... [containing case-mix adjusters], μ_{ip} is an intercept parameter for [reporting entity] p , and ε_{ipj} is the error term.

Because all between-[reporting entity] effects are absorbed into the dummy variable coefficients, the β_i coefficients represent within-[reporting entity] effects of the adjuster variables. The adjusted [reporting entity] ratings correspond to the dummy variable effects μ_{ip} . The adjusted ratings (after centering) can be interpreted as the ratings we would expect for each [reporting entity] if every [reporting entity] had the same distribution of beneficiary-level variables (i.e., equivalent mixes of beneficiaries).

¹ For the one dichotomous item, an analogous logistic regression is used.

6.2 Assumptions of CMA

In order for case-mix adjusted means to have the interpretation discussed above, a number of assumptions must be met. A first assumption is that the case-mix adjusters are not endogenous. This assumption means that the values of the case-mix adjusters are not substantially influenced by actions of the providers or by beneficiaries' experiences with providers. This assumption is not easily testable in cross-sectional studies. This report does not attempt to independently establish the exogeneity of the case-mix adjusters employed but instead restricts consideration to the variables listed in *Table 6.1*, for which there is general consensus regarding an absence of serious endogeneity in the context of case-mix adjustment of health care data.

Table 6.1
Description of independent variables used in MFFS case-mix adjustment (2004)

Variable	Response options
Age	≤44, 45-64, 65-69, 70-74, 75-79, 80-84, ≥85
Education	≤8th grade, some high school, high school graduate or GED, some college (but less than 4-year degree), 4-year college graduate, >college graduate (some graduate school beyond the 4-year degree)
General health perception	Excellent, very good, good, fair, poor
Mental health perception	Excellent, very good, good, fair, poor
Proxy respondent status	No assistance on survey, someone helped but did not answer for you, someone answered for you
Dual-eligibility indicator (eligible for Medicaid program)	Yes, no

A second assumption is that the case-mix adjusters are linear in their effects on the outcomes to which they are applied. This assumption is applicable to ordinal and continuous case-mix adjusters and is empirically verifiable.

A third assumption is that the effects of case-mix adjusters are homogenous across the reporting entities being compared. This assumption can be verified empirically through the use of interaction terms in linear models and is specific to the set of reporting entities being compared.

6.3 Desirable Properties of CMA Models

There are three properties that a good MFFS CMA model would possess: (1) precision, (2) parsimony, and (3) robustness across applications. The criterion of precision means that there is strong evidence that the CMA variables are truly associated with ratings and reports and that the magnitude of these associations is well estimated. The criterion of parsimony means that the model is as simple as possible without sacrificing explanatory power. In other words, variables that add to model complexity without adding to model impact are excluded. The criterion of robustness across applications means that the model selected is appropriate across the variations in reporting formats to which it is applied.

The criterion of precision requires that case-mix adjusters have statistically significant effects and that the ratio of estimated parameters to their standard errors (t-statistics) be large.

Implementing the criterion of parsimony requires a definition of explanatory power. We will use the E.P. (explanatory power) statistic, a unitless measure of the impact of a case-mix adjuster developed by the Harvard team in the context of MA CMA (Cioffi et al., 2001). Briefly, the impact of a case-mix adjuster on adjusted scores is a product of two quantities: (1) the proportion of the variance of the outcome explained by the case-mix adjuster in an individual-level regression (incremental change in R-sq) and (2) the variance in mean levels of the case-mix adjuster across reporting entities. The formula for E.P. is as follows:

$$\text{E.P.} = \text{Var}(\text{Reporting Entity})/\text{Var}(\text{Error}) * (\text{net increment in R-sq})$$

The derivation of this formula may be found in the 2000 MA CMA report (Cioffi et al., 2001). Because values for E.P. tend to be very small, we will follow the convention of presenting E.P. * 1000. Parsimony requires selecting the simplest model that accounts for most of the explanatory power possible with more elaborate models.

Adjusted ratings and composites are presented in a number of different formats and at different levels of aggregation. It is desirable that a CMA model be applicable across this variety of contexts and that its effects be reasonably consistent across these applications. The linear models presented here treat the 11-point global ratings and the 3- and 4-level ordinal scales as continuous variables, computing means. This approach maximizes the statistical power available to compare CMA models and also corresponds to the format in which adjusted ratings and composites may be presented to CMS, state QIOs, and researchers. On the other hand, dichotomized presentations of these same ratings and composites will be presented to consumers. It is desirable that CMA models behave similarly with these dichotomized outcomes. Likewise, reporting entities will be states for some applications and presentations but may be geounits or CMS regions for other applications and presentations. It is desirable that CMA models behave similarly across these contexts.

6.4 Models

The two goals of MFFS CMA (within-MFFS comparison and MFFS-vs.-MA comparison) suggest similar, but slightly different, CMA models. *Table 6.1* describes the independent variables recommended for case-mix adjustment for both models.

6.5 Results

6.5.1 Consistency of Case-Mix Adjuster Coefficients

Case-mix adjusters had consistent coefficients within MFFS over the 5 years of the project, especially education and self-rated mental health. Case-mix coefficients for the rating of Medicare were less stable than those for other ratings. These patterns have been consistently nonlinear, suggesting that they are best parameterized categorically. The tendency of health status to be predictive of more positive global ratings has been consistently stronger within MA than within MFFS (see *Table 6.2*). A similar pattern for report items in the first few years of the project has largely disappeared. The self-reported rating of mental health status is the one case-mix adjuster that has been consistently comparable between MFFS and MA.

Whereas the case-mix coefficients initially exhibited substantial regional variation within MFFS, they are now quite consistent across regions, with the exception of coefficients for the global rating of Medicare. In terms of explanatory power, education and mental health ratings have been the most consistently important case-mix variables. Age and overall health rating have been the next most important among those variables employed in the final models. Among those variables not included in final models, current life satisfaction and phone versus mail mode would have relatively large impacts if they were included, both having a greater potential impact than overall self-rated health. (The life satisfaction question, however, was not included in the MA survey and therefore was not available for CMA comparisons between the MA and MFFS plan types.)

Education and self-rated mental health appear to have a variety of properties that are superior to those exhibited by overall self-rated health and age. The variability of CMA patterns for the rating of Medicare suggests that this measure may be more of a barometer of the popularity of the Medicare program, subject to media and other influences, than a direct measure of health care experiences.

It could be argued that both age and overall self-rated health are CMA variables that have been retained through historical precedence and are no longer as important as they once were, given the addition of self-rated mental health to the CMA model. Because these variables also are much less stable over time, delivery system, and geography than self-rated mental health and education, it could be argued that an appealing and more parsimonious CMA model might drop overall self-rated health and age as adjustment factors. Doing so could have the appeal of better distinguishing true differential experiences by age and health status from patterns of response tendency.

6.5.2 Impact of Case-Mix Adjustment

The impact of within-MFFS CMA is moderate (15 to 44 percent of the standard deviation of the unadjusted geounit means) but not negligible (largest geounit adjustments are 0.4 to 1.6 such standard deviations). Among the ratings, adjustments are largest for the rating of Medicare and smallest for the rating of personal doctor. The magnitude of these impacts has been similar from year to year.

Table 6.2
Comparison of magnitude of CMA coefficients for the global ratings, MFFS vs. MA (2000-2004)

Case-mix adjuster:	Age					Education					GHP					MHP				
Survey year:	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Rating description																				
Global (scale 0 = worst to 10 = best)																				
How would you rate your personal doctor now																N/A				
How would you rate your specialist now																N/A				
Rate overall health care, past 6 months																N/A				
Rate all experience with Medicare/health plan																N/A				
Getting Needed Care (scale 1-4)																				
Was it a problem getting your choice of doctor																N/A				
6 mo: Problem getting referral to specialist																N/A				
6 mo: Problem getting care needed																N/A				
6 mo: Problem waiting for plan approval																N/A				
Consumer Service, Information, and Paperwork (scale 1-4)																				
6 mo: Problem getting help from customer service																N/A				
6 mo: Problem understanding materials																N/A				
6 mo: Paperwork problems																N/A				

(continued)

**Table 6.2
(continued)**

Case-mix adjuster:	Age					Education					GHP					MHP				
Survey year:	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Rating description																				
Getting Care Quickly (scale 1-5)																				
6 mo: Got help/advice needed																N/A				
6 mo: Saw doctor wanted for routine care																N/A				
6 mo: Got care as soon as wanted																N/A				
6 mo: Taken to room within 15 minutes																N/A				
Good Communication (scale 1-5)																				
6 mo: Doctor listened carefully																N/A				
6 mo: Doctor explained well																N/A				
6 mo: Doctor showed respect to you																N/A				
6 mo: Doctor spent enough time with you																N/A				

- Indicates that the magnitude of the linear trend for the case-mix variable in question is significantly greater within the MA sample than within the MFFS sample ($p < .05$).
- Indicates that the magnitude of the linear trend for the case-mix variable in question is significantly greater within the MFFS sample than within the MA sample ($p < .05$).
- Indicates no significant difference between MFFS and MA.

NOTE: N/A = not applicable; GHP = general health perception; MHP = mental health perception.

At the state level, the mean absolute within-MFFS CMA is 17 to 44 percent of a state-level standard deviation for the two ratings and three composites reported on the www.Medicare.gov web site, with the largest state adjustments being three to five times that large. The magnitude of these adjustments has been similar from year to year as well.

For national MFFS-vs.-MA comparisons, comparison weights have gone from moderate adjustments in favor of MA in 2001 to very small adjustments in 2002 through 2004. One interpretation is that MFFS sample was initially scarce in the geographic regions that had the least positive Medicare experiences among those regions with MA penetration. The shrinking effect of the comparison weights may be attributable to the reallocation of MFFS sample into the counties with high MA penetration but low population that were initially underrepresented, in the efforts to reduce the design effect of the comparison weights. In other words, the geographic distribution of the MFFS sample is much better matched to MA in 2004 than it was in 2001.

For the same national comparisons, CMA has gone from moderate adjustments in favor of MA in 2001 to small adjustments in favor of MA in 2002 to moderate adjustments in favor of MFFS in 2003 and 2004. Adjustments favoring MA probably correspond to MA having a higher proportion of certain types of negative responders: the young and the better educated. Adjustments favoring MFFS probably correspond to MFFS having a higher proportion of a different class of negative responders: the unhealthy. The shift from adjustments favoring MA to adjustments favoring MFFS could mean that age and education selection into MA is becoming weaker, but health selection is becoming stronger. The MFFS nonresponse and design weights were more important than the comparison weights but less important than CMA in 2002 through 2004.

Within-state CMA of MFFS-vs.-MA differences had an average within-state effect of 0.7 to 2.8 percent in 2004. These adjustments are generally larger than those in 2003 and represent a substantial increase in impact since 2001 and 2002 for three measures (Good Communication, Rate Medicare, and Rate Health Care). These 2004 adjustments are 27 to 67 percent of the standard deviation of the state-to-state variation in the MFFS-vs.-MA difference. The largest adjustments were 1.7 to 7.5 percent. The CMA effects were in favor of MFFS in almost all cases in 2003 and 2004. In 2004, there were three measures (again, Good Communication, Rate Medicare, and Rate Health Care) for which all states were adjusted in favor of MFFS. By contrast, 2001 and 2002 adjustments were not only smaller but were in favor of MA more often than not.

The 2002 through 2004 increase in state-level CMA adjustments in favor of MFFS, reflected in both consistency and magnitude, cannot easily be explained by a corresponding trend in the explanatory power of the CMA model at the individual level. Rather, it suggests that within-state selection on characteristics related to CMA models (health, age, education) is becoming stronger. It is likely that the tendency of MA beneficiaries to be healthier than MFFS beneficiaries within states has become stronger over 2002 through 2004, and the CMA model is making greater adjustments in favor of MFFS to account for this trend.

SECTION 7
BENEFICIARY HEALTH STATUS AND HEALTH CARE EXPERIENCES:
DIFFERENCES BETWEEN MEDICARE ADVANTAGE AND FEE-FOR-SERVICE,
2000-2003

by Marc N. Elliott, Ph.D., RAND; Shulamit L. Bernard, Ph.D., RTI; and
Lisa Carpenter, B.S., RTI

(Note: This chapter reflects joint work with Alan M. Zaslavsky, Ph.D., and
Paul D. Cleary, Ph.D., of Harvard Medical School.)

Section 6 (Case-Mix Adjustment) notes persistent differences between the Medicare CAHPS[®] Fee-for-Service (MFFS) Survey and the Medicare Advantage (MA) CAHPS Survey in the tendency for healthier beneficiaries to report more positive experiences. While this tendency exists within both systems, it has generally been stronger for MA than for MFFS. This pattern has held consistently for the four CAHPS global ratings. For report items, the pattern held strongly in 2000 but has weakened since then.

This pattern suggests the possibility that differences between MFFS and MA beneficiary experiences might differ by beneficiary health status and that such differences may have changed over time. If this were the case, beneficiaries might want to consider their own health status when comparing MFFS and MA (and perhaps even within MA plans), and reporting that clarified such distinctions might prove useful. In particular, it may be of interest to evaluate the conventional wisdom that the greatest strength of managed care lies in the treatment of relatively healthy beneficiaries and the greatest strength of fee-for-service care lies in the treatment of relatively unhealthy beneficiaries.

To address this question, we made national comparisons between MFFS and MA outcomes from the Medicare CAHPS survey in the 4 consecutive years 2000 through 2003 within subgroups defined by beneficiaries' self-rated health status. Within each cell defined by a combination of year and health status category, we compared MFFS and MA nationally for each of a series of CAHPS survey outcomes. National comparisons were chosen to maximize the statistical power to compare health-based subgroups. To ensure that annual comparisons reflected actual change within the same geographic regions, rather than changes in managed care penetration, we restricted comparisons to a common set of counties that had both MFFS and MA beneficiaries in each of the 4 years. Finally, to compare MFFS and MA across a variety of outcomes, we examined outcomes of three types: global ratings, reports-of-care composites, and immunization. Section 7 reports the results of these comparisons.

7.1 Sample

The geographic area used for this study consisted of the 617 counties within 40 states where beneficiaries had a choice between MFFS and MA in each of the 4 years 2000 through 2003. This area included more than 90 percent of MA beneficiaries and about half of all MFFS beneficiaries in any given year. The total corresponding sample sizes were 610,231 MA and 220,584 MFFS beneficiaries. *Table 7.1* describes the distribution of this sample across the 10 CMS regions. As can be seen, no region contributes more than 19 percent of the sample for MFFS (5-Chicago) or MA (9-San Francisco).

Table 7.1
Distribution of sample by CMS region

CMS region	Percentage of MFFS sample	Percentage of MA sample
1. Boston	7	6
2. New York	14	11
3. Philadelphia	13	10
4. Atlanta	16	15
5. Chicago	19	17
6. Dallas	7	6
7. Kansas City	5	5
8. Denver	3	3
9. San Francisco	11	19
10. Seattle	5	8

7.2 Outcome Measures

Six outcomes reported on the Medicare Compare web site (which can be accessed at www.medicare.gov) were used as outcomes. They included all three report composites that appear on the web site and one of the two global ratings that are presented. We omitted the Rate Medicare and Rate Health Plan global ratings from these comparisons because of concerns about the comparability of the question for MFFS and MA. Also included were two reported measures of immunization.

The report composites are aggregations of four items. In the case of the Care Quickly and Good Communication composites, the items had a four-level response scale regarding how often a desirable event occurred (1 = Never, 2 = Sometimes, 3 = Usually, 4 = Always). In the case of the Needed Care composite, the items had a three-level response scale regarding how much of a problem something was (1 = A big problem, 2 = A small problem, 3 = Not a problem). In all cases, the items were treated as having interval scale properties, and linearly coded scores were averaged across items within composites.

The global rating of all care received had an 11-point response scale (0 to 10), with verbal anchors at 0 (“Worst possible care”) and 10 (“Best possible care”). Flu shots and pneumonia shots are indicated for all Medicare beneficiaries. For each type of immunization, our outcome was a dichotomous indicator of having received the immunization in question.

7.2.1 Self-Rated Health Status

We classified beneficiaries into three categories on the basis of their response to a single question: “How would you rate your overall health?” The five response options were

“Excellent,” “Very good,” “Good,” “Fair,” and “Poor.” We collapsed the first two and last two categories to maximize the statistical power of comparisons.

7.2.2 Case-Mix Adjustment Variables

Education, age, proxy respondent status, and county of residence were employed as categorical case-mix adjusters. The case-mix adjustment (CMA) model used in these analyses was similar to that used in the 2001 through 2003 MFFS-vs.-MA CMA (see Section 6), with three exceptions. First, for simplicity, regional interactions were not included. Second, as was the case in 2000 MFFS-vs.-MA CMA, self-rated mental health was not included as a CMA variable because of its strong association with self-rated overall health. Finally, rather than employing geographic weights, we employed indicators of exact county of residence to create geographic comparability.

7.3 Models

A total of 72 linear regressions were performed, one for each factorial combination of the six outcomes, 4 years (2000/2001/2002/2003), and three self-reported health status categories (excellent or very good/good/fair or poor). These models were performed using the CAHPS macro adjusting for education, age, proxy response status, and exact county of residence. This is equivalent to a linear regression with the CMA variables and an MFFS indicator predicting each outcome. We examined the coefficients associated with the MFFS indicator and their statistical significance at the .05 level of statistical significance.

7.4 Results

7.4.1 Overall Levels

One overall pattern that emerged was that performance was consistently high. Across the 24 combinations of year, health status, and beneficiary type (MFFS vs. MA), the mean global rating of care received ranged from 84 percent of its maximum possible value (MA for those in fair or poor health, 2001 through 2003) to 92 percent of its maximum possible value (2000 MA and 2003 MFFS for those in excellent or very good health). Within both MFFS and MA, global ratings reflected more positive experiences for those in better health.

Across the 72 combinations of composite, year, health status, and beneficiary type, the mean composite score ranged from 71 percent of its maximum possible value (Care Quickly composite for MA beneficiaries in poor and fair health, 2000 and 2001) to 95 percent of its maximum possible value (Needed Care composite for MFFS beneficiaries in excellent or very good health, 2001). Within both MFFS and MA, composite scores reflected more positive experiences for those in better health.

Across the 48 combinations of immunization type, year, health status, and beneficiary type, immunization ranged from 57 percent (pneumonia for MFFS beneficiaries in excellent and very good health, 2000) to 78 percent (flu for MA beneficiaries in fair or poor health, 2000 and 2003). Within both MFFS and MA, immunization rates were lower for those in better health. This result probably reflects a perception of the severity of the need, even though these immunizations are indicated for all beneficiaries. (The differences in immunization rates may

also reflect greater interface with health providers for beneficiaries who report poorer health status.)

7.4.2 Direction and Significance of Differences

Table 7.2 summarizes the directions and significance of the 48 case-mix adjusted comparisons of MFFS and MA. A clear split is apparent between the immunization outcomes on the one hand and the beneficiary ratings and reports on the other. In the case of immunization, all 24 cells favor MA. MA has consistently provided higher rates of both immunizations to beneficiaries of all health statuses.

Table 7.2
Comparison of MFFS and MA by health status (2000-2003)

Self-reported health status	Year	Rating of care	Needed Care composite	Care Quickly composite	Good Communication composite	Flu shot	Pneumonia shot
Excellent or very good	2000	MA	=	MFFS	MA	MA	MA
	2001	MFFS	MFFS	MFFS	=	MA	MA
	2002	MFFS	MFFS	MFFS	MFFS	MA	MA
	2003	MFFS	MFFS	MFFS	MFFS	MA	MA
Good	2000	=	=	MFFS	=	MA	MA
	2001	=	MFFS	MFFS	=	MA	MA
	2002	MFFS	MFFS	=	=	MA	MA
	2003	MFFS	MFFS	MFFS	MFFS	MA	MA
Fair or poor	2000	MFFS	=	MFFS	MFFS	MA	MA
	2001	MFFS	MFFS	MFFS	MFFS	MA	MA
	2002	MFFS	MFFS	=	MFFS	MA	MA
	2003	MFFS	MFFS	MFFS	MFFS	MA	MA

NOTE: “MFFS” indicates that the magnitude of the linear trend for the case-mix variable in question is significantly greater within the MFFS sample than within the MA sample ($p < .05$). “MA” indicates the converse, and “=” indicates no significant difference between MFFS and MA.

For the other four outcomes, 35 of 38 comparisons favored MFFS, only 2 favored MA, and 11 did not differ at $p < .05$. The advantage of MFFS was most consistent for those in fair or poor health, where MFFS was rated higher in 14 of 16 comparisons and MA was rated higher in none. For those in good to excellent health, MFFS was rated higher in 21 of 32 comparisons, and MA was rated higher in 2 comparisons (both in 2000 and involving those in excellent or very good health). The outcome that most consistently favored MFFS was the Care Quickly composite (significantly better in 10 comparisons of 12), whereas Good Communication showed

the smallest difference among beneficiary evaluations (7 comparisons that favored MFSS and 1 that favored MA).

It also appears that the consistency of the MFSS advantage on these items increased from 2000 to 2003. In 2000, 5 comparisons of 12 favored MFSS and 2 favored MA. In 2001 and 2002, 18 of 24 favored MFSS. By 2003, all 12 favored MFSS.

7.4.3 Size of Differences

Immunization rates for MA are 4 to 7 percent higher than MFSS for flu and 5 to 10 percent higher than MFSS for pneumonia. The differences are greatest for those in fair or poor health. The advantage of MFSS over MA for the composites and the global rating is generally small to very small. Averaging across all health statuses, the difference ranges from 0.03 standard deviations (Good Communication) to 0.20 standard deviations (Care Quickly).

For three of the four beneficiary evaluation outcomes (all but Care Quickly), the advantage of MFSS over MA is largest for beneficiaries in fair to poor health, for whom the effect size is in the small-to-medium range (0.2 to 0.5 standard deviations).

7.5 Conclusions

Evaluations of Medicare have been consistently strong, especially for healthy beneficiaries. Immunizations, on the other hand, are more consistently given to less healthy beneficiaries. MA has consistently higher rates of immunization for all beneficiaries, but especially for the unhealthy, where the need is presumably greatest.

Beneficiary evaluations of MFSS are slightly more positive than their evaluations of MA in a pattern that has been fairly consistent and became more consistent over the 4 years of the analyses. The MFSS advantage is strongest for those in fair and poor health and is most pronounced on the Care Quickly composite.

SECTION 8 SUBGROUP ANALYSES

by Shulamit L. Bernard, Ph.D., Erica R. Brody, M.P.H.,
and Nathan D. West, M.P.A., RTI

During the past 5 years, the Medicare CAHPS[®] implementation project has provided CMS with data that have been used to help beneficiaries decide among health plan options. Data collected through the Medicare CAHPS Fee-for-Service (MFSS) Survey and the Medicare Advantage (MA) CAHPS Survey have enabled beneficiaries residing in areas in which there is a choice of plans (managed care or fee-for-service) to access data comparing CAHPS measures for these plan types.

In addition to providing data for comparison among plan options, RTI has conducted analyses of the data to examine experience and satisfaction with health care services by subgroups of Medicare beneficiaries. Analyses of Medicare subgroups are conducted to gain a better understanding of the differences in health services experience and satisfaction among Medicare beneficiaries by geographic levels (national, regional, and state level), sociodemographic characteristics, health plan options, and health status. The MFSS population is quite heterogeneous in terms of demographic characteristics, region of residence, presence of supplemental insurance (whether with or without prescription drug coverage or Medicaid), and health-related characteristics. These subgroups of the MFSS beneficiaries have vastly different experiences with and expectations of the health care system and, thus, may perceive the quality of and access to services differently.

In Section 8, we provide results of analyses of data from the 2004 MFSS survey. (The complete survey instrument is provided in *Appendix A*.) The analyses presented in this section examine differences across selected subgroups for the most-positive CAHPS ratings and responses (i.e., “10,” “Always,” “Not a problem,” or “Yes”). A total of nine performance indicators (five composite indicators and four rating indicators) were used from the survey:

- Needed Care Composite
- Good Communication Composite
- Care Quickly Composite
- Respectful Treatment Composite
- Medicare Customer Service Composite
- Rate Personal Doctor
- Rate Specialist
- Rate Health Care
- Rate Medicare

For each indicator, the results are stratified by the following MFFS subgroups:

- Sociodemographics
 - Age
 - Education
 - Ethnicity
 - Race
 - Gender
- Health status
 - Self-reported general health
 - Self-reported mental health
 - Chronic illness
 - Hospitalization
 - Disability (added in 2002 through 2004)
- Access to health care
 - Insurance status
 - Personal doctor

8.1 Methods

8.1.1 CAHPS Measures

We began our individual-level analysis by calculating unweighted and weighted frequencies for all categorical variables in the data set. We present and summarize the weighted frequencies and cross-tabulations for key variables in the subgroup analysis report for 2004 (Brody, West, and Bernard, 2005). The analyses presented in this report examine differences across selected data aggregation options for the most-positive CAHPS ratings and responses (i.e., “10,” “Always,” “Not a problem,” or “Yes”) that have been case-mix adjusted. *Table 8.1* presents the survey questions used to construct each of the CAHPS composites and ratings.

To obtain ratings and composites, we used the CAHPS 3.4 Survey and Reporting Kit macro, which enables us to report on both means and proportions. Furthermore, the ratings and composites at different aggregation levels were case-mix adjusted using models developed for

Table 8.1
CAHPS performance indicators and ratings

Indicators and ratings	2004 survey questions
<p>Needed Care Composite^a (with numerical response categories of 1 = A big problem, 2 = A small problem, 3 = Not a problem)</p>	<ul style="list-style-type: none"> ▪ Since you joined Medicare, how much of a problem, if any, was it to get a personal doctor or nurse you are happy with? (Q8) ▪ In the last 6 months, how much of a problem, if any, was it to see a specialist that you needed to see? (Q11) ▪ In the last 6 months, how much of a problem, if any, was it to get the care, tests, or treatment you or a doctor believed necessary? (Q24) ▪ In the last 6 months, how much of a problem, if any, were delays in health care while you waited for approval from Medicare? (Q26)
<p>Good Communication Composite^a (with numerical response categories of 1 = Never, 2 = Sometimes, 3 = Usually, 4 = Always)</p>	<ul style="list-style-type: none"> ▪ In the last 6 months, how often did doctors or other health providers listen carefully to you? (Q30) ▪ In the last 6 months, how often did doctors or other health providers explain things in a way you could understand? (Q31) ▪ In the last 6 months, how often did doctors or other health providers show respect for what you had to say? (Q32) ▪ In the last 6 months, how often did doctors or other health providers spend enough time with you? (Q33)
<p>Care Quickly Composite^a (with numerical response categories of 1 = Never, 2 = Sometimes, 3 = Usually, 4 = Always)</p>	<ul style="list-style-type: none"> ▪ In the last 6 months, when you called during regular office hours, how often did you get the help or advice you needed? (Q16) ▪ In the last 6 months, not counting the times you needed health care right away, how often did you get an appointment for health care as soon as you wanted? (Q20) ▪ In the last 6 months, when you needed care right away for an illness, injury, or condition, how often did you get care as soon as you wanted? (Q18) ▪ In the last 6 months, how often were you taken to the exam room within 15 minutes of your appointment? (Q27)
<p>Respectful Treatment Composite (with numerical response categories of 1 = Never, 2 = Sometimes, 3 = Usually, 4 = Always)</p>	<ul style="list-style-type: none"> ▪ In the last 6 months, how often did office staff at a doctor's office or clinic treat you with courtesy and respect? (Q28) ▪ In the last 6 months, how often were office staff at a doctor's office or clinic as helpful as you thought they should be? (Q29)

(continued)

Table 8.1
(continued)

Indicators and ratings	2004 survey questions
Medicare Customer Service Composite (with numerical response categories of 1 = A big problem, 2 = A small problem, 3 = Not a problem)	<ul style="list-style-type: none"> ▪ In the last 6 months, how much of a problem, if any, did you have with paperwork for Medicare? (Q53) ▪ In the last 6 months, how much of a problem, if any, was it to find or understand this information? (Medicare information in written materials or on the Internet) (Q49) ▪ In the last 6 months, how much of a problem, if any, was it to get the help you needed when you called Medicare customer service? (Q51)
Rate Medicare (with option to rate 0 [worst health plan possible] to 10 [best health plan possible])	Using <u>any number from 0 to 10</u> where 0 is the worst health plan possible and 10 is the best health plan possible, what number would you use to rate Medicare? (Q54)
Rate Health Care (with option to rate 0 [worst health care possible] to 10 [best health care possible])	Using <u>any number from 0 to 10</u> where 0 is the worst health care possible and 10 is the best health care possible, what number would you use to rate your health care in the last 6 months? (Q34)
Rate Personal Doctor (with option to rate 0 [worst personal doctor or nurse possible] to 10 [best personal doctor or nurse possible])	Using <u>any number from 0 to 10</u> where 0 is the worst personal doctor or nurse possible and 10 is the best personal doctor or nurse possible, what number would you use to rate your personal doctor or nurse? (Q6)
Rate Specialist (with option to rate 0 [worst specialist possible] to 10 [best specialist possible])	Using <u>any number from 0 to 10</u> where 0 is the worst specialist possible and 10 is the best specialist possible, what number would you use to rate your specialist? (Q13)

^a Composites featured on the Medicare Personal Plan Finder web page available to Medicare beneficiaries on the Medicare web site (www.medicare.gov/MPPF/DefaultVersion/home.asp).

the within-MFFS comparisons. The development of the specific models is discussed in the 2004 case-mix report (Cioffi et al., 2004). The CAHPS macro allows specification of the level of aggregation, and we aggregated to the geounit, state, CMS region, and nation as a whole. We then specified stratification variables to compare variation among subsets of Medicare beneficiaries. The stratification variables included age, gender, education, race, ethnicity, self-perceived general health status, self-perceived mental health status, chronic illness, overnight hospitalization, personal doctor or nurse, disability, and insurance.

8.1.2 MFFS Enrollee Characteristics

The subgroups that were used for stratification across the selected CAHPS indicators are shown in *Table 8.2*, with data sources indicated.

Table 8.2
Subgroups used for stratification across selected CAHPS indicators

Variable/construct	Categories	Data source
Age	18-45 46-64 65-69 70-74 75-79 80+	Self-reported. If missing/not reported, then determination was made from the Enrollment Database (EDB) file.
Education	8th grade or less Some high school, but did not graduate High school graduate or GED Some college or 2-year degree 4-year college degree More than 4-year college degree	Self-reported.
Ethnicity	Hispanic or Latino Medicare beneficiaries Not Hispanic or Latino Medicare beneficiaries	Self-reported. If missing/not reported, then determination was made via an algorithm that used additional information from the survey data, the EDB file, and the Spanish Surname List. A detailed description of the algorithm employed can be found in the full 2002 subgroup analysis report (Brody et al., 2003).
Race	Medicare beneficiaries of White race Medicare beneficiaries of Black race Medicare beneficiaries of other race	Self-reported. If missing/not reported, then determination was made via an algorithm that used information from the EDB file. A detailed description of the algorithm employed can be found in the full 2002 subgroup analysis report (Brody et al., 2003).
Gender	Male Female	Self-reported. If missing/not reported, then determination was made from the EDB file.
Health status	Medicare beneficiaries who reported their physical health status as excellent, very good, good, fair, or poor Medicare beneficiaries who reported their mental health status as excellent, very good, good, fair, or poor Medicare beneficiaries who reported chronic illness Medicare beneficiaries who reported being hospitalized overnight or longer in the last 12 months	Self-reported.

(continued)

**Table 8.2
(continued)**

Variable/construct	Categories	Data source
Insurance status	Medicare beneficiaries who are also enrolled in Medicaid (i.e., the dually eligible)	EDB file. If EDB file indicates not on Medicaid, then remaining insurance categories were coded as below.
	Medicare beneficiaries who have additional health care insurance coverage without a prescription drug benefit	Self-reported. If response to Question 1 ^a is “Yes” and response to Question 2 ^b is not “Medicaid” and response to Question 46 ^c is either “No” or missing, then assign to this category.
	Medicare beneficiaries who have additional health care insurance coverage including a prescription drug benefit	Self-reported. If response to Question 46 is “Yes,” then assign to this category.
	Medicare beneficiaries who have no additional insurance	Self-reported. If response to Question 1 is “No” and response to Question 46 is “No” or missing; OR if response to Question 1 is “Yes” and only response to Question 2 is “Medicaid”; OR if response to Question 1 is missing and response to Question 2 is “I don’t have health insurance other than Medicare” and response to Question 47 is “No” or missing; OR if did not respond to Question 1 and Question 2 and response to Question 46 is “No,” then assign to this category.
	Medicare beneficiaries who did not respond to this question (missing)	Self-reported. If no response to Question 1, 2, or 46, then assign to this category.
Personal doctor	Medicare beneficiaries who reported having a personal doctor or nurse	Self-reported.
Disability		EDB file. This indicator was created from the beneficiary’s history of entitlement reason codes (BENE_ENTLMT_RSN_CD). If any of the last 10 entitlement codes indicated disability (values of 1 or 3), then the beneficiary was assigned as disabled.

^a Question 1 text: “Do you have any other insurance that pays at least some of the cost of your health care?”

^b Question 2 text: “Please mark the box below for each type of health insurance that you have.”

^c Question 46 text: “Do you have any other health insurance that pays at least some of the costs of medicines prescribed by doctors and other health providers?”

NOTE: For discussion of the case-mix model, see Section 6.

When we stratified by a variable that is in the case-mix model, we removed that particular variable from the case-mix model before running the macro. For example, when we stratified by the variable “age,” we removed age from the case-mix model. We followed this same procedure for each stratification variable that was in the case-mix model.

The analyses described in this section do not focus on statistical significance because with such a large sample, even fractional percentage point differences may prove to be statistically significant but not substantive. Therefore, our focus is on substantive percentage point differences for the various indicators. (All of the substantive differences shown are statistically significant at the .05 level at least.)

8.1.3 Case-Mix Adjustment

CMS is required by the 1997 Balanced Budget Act (BBA) to provide beneficiaries with information that will enable them to choose between Medicare plan options. This requirement, also reiterated in the Medicare Modernization Act of 2003, necessitates the construction of CAHPS ratings and composites that can be compared across managed care plans and between MA and MFFS options. The implication for the construction of the composites from the MFFS survey is that they be created in as like a manner as possible to those from the MA survey.

Because CMS intends to provide quality information to support Medicare beneficiaries’ choice of Medicare health plan options, it is essential that differences between the composition of Medicare beneficiaries in MFFS and in MA be adequately adjusted for when data are reported. For MFFS, this adjustment must be made on the reporting-unit level and, in order to allow like comparisons, must be comparable in rigor and scope to the adjustment made on the MA sample. Case-mix adjusted consumer ratings can provide more valid health plan comparisons than can unadjusted ratings by controlling for factors related to systematic response biases. Adjusted data are therefore potentially more appropriate for comparing the quality of care delivered.

Case-mix adjustment for systematic bias is useful when comparing assessments of different plans or regions if members of a particular demographic group that is more or less inclined than others to assign poor ratings to bad care are disproportionately enrolled in a particular plan or, as in the case of within-MFFS comparisons, these members reside in a particular geographic area. In many markets, MFFS beneficiaries tend to be older and frailer than MA beneficiaries. To present fair comparisons, the influence of plan composition must be accounted for in the reporting statistic. A similar argument can be made for comparison of ratings and composites for different geographic units within the MFFS population. For these reasons, all ratings and composites used to compare MFFS and MA, or regions within the MFFS population, are case-mix adjusted.

8.2 Characteristics of 2004 CAHPS MFFS Population

In *Table 8.3*, we briefly summarize sociodemographic characteristics, health status, and insurance status of all survey respondents weighted to the U.S. population of MFFS beneficiaries.

Table 8.3
Sociodemographic characteristics, health status, and access to care: Frequencies weighted to the CAHPS MFFS population (n = 117,102)

Descriptive variable	Percent	Descriptive variable	Percent
Sociodemographic characteristics		Health status (self-reported)	
<i>Age</i>		<i>Self-perceived general health status</i>	
18-44 years	2	Excellent	6
45-64	11	Very good	20
65-69	23	Good	33
70-74	21	Fair	30
75-79	18	Poor	11
80 years or older	25	<i>Self-perceived mental health status</i>	
<i>Gender</i>		Excellent	22
Male	43	Very good	29
Female	57	Good	30
<i>Education</i>		Fair	14
8th grade or less	12	Poor	4
Some high school, but did not graduate	14	<i>Had a physical/medical condition that lasted at least 3 months</i>	
High school graduate or GED	35	<i>Hospitalized overnight or longer in the last 12 months</i>	
Some college or 2-year degree	21	<i>Disabled</i>	
4-year college degree	8	Access to care (self-reported)	
More than 4-year college degree	10	<i>Had a personal doctor or nurse</i>	
<i>Race</i>		<i>Insurance—plans in addition to Medicare</i>	
White	87	Additional insurance with prescription drug coverage	48
Black	9	Additional insurance without prescription drug coverage	25
Other	4	No additional insurance	13
<i>Ethnicity</i>		Dual eligible/Medicaid	14
Hispanic or Latino	7	Missing	< 1
Not Hispanic or Latino	93		

NOTE: Proportions weighted using a sample of 117,102 respondents in 2004. Due to rounding, percentages may sum to slightly less or more than 100 percent.

8.2.1 Sociodemographics

The majority of beneficiaries (62 percent) were 65 to 79 years of age, and one out of four beneficiaries were 80 years of age or older. Only 13 percent of the population were under 65 years of age. More than half (57 percent) were female. About one-quarter (26 percent) of respondents had less than a high school education, approximately one-third (35 percent) were high school graduates, and the remaining 39 percent had more than a high school education. Most beneficiaries (87 percent) were White, 9 percent were Black (African American), 4 percent were of other/unknown race, and 7 percent were Hispanic or Latino.¹

8.2.2 Health Status

Approximately one-quarter of respondents reported excellent or very good health, 33 percent reported good health, and 41 percent were in fair or poor health. More than half (51 percent) reported excellent or very good mental health, almost one-third (30 percent) were in good mental health, and around 18 percent reported being in fair or poor mental health. Almost three out of four beneficiaries (72 percent) reported having a physical or medical condition that lasted at least 3 months, and almost one-quarter (23 percent) reported having been hospitalized overnight in the past year. Approximately 19 percent of the beneficiaries were disabled, as indicated by information provided in the CMS Enrollment Database (EDB) regarding their original reason for Medicare entitlement.

8.2.3 Access to Care

Nearly 9 of every 10 beneficiaries reported having a personal doctor. Almost half (48 percent) of beneficiaries reported having private health insurance in addition to Medicare and prescription drug coverage, and one-quarter reported having health insurance in addition to Medicare but no coverage for prescription drugs. Further, 14 percent were dually eligible for both Medicare and Medicaid, and 13 percent reported having no insurance in addition to Medicare. Detailed information about supplemental insurance coverage can be found in *Table 8.4*.

8.3 Key Findings

8.3.1 Findings From 2000 Through 2004

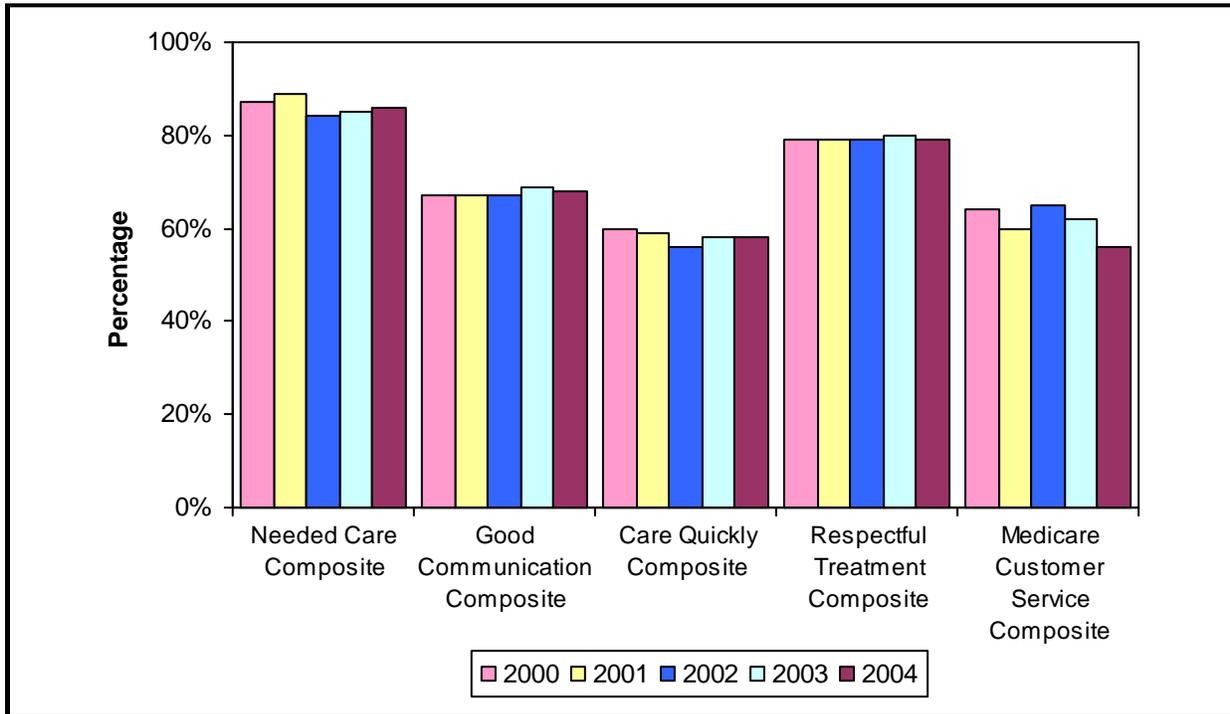
During the 5-year period from 2000 through 2004, between 84 and 89 percent of MFFS beneficiaries reported that they always received needed care (see *Figure 8.1*). Although there was a drop from 89 percent in 2001 to 84 percent in 2002, the proportion of beneficiaries reporting that they always received needed care remains quite high (86 percent in 2004).

¹Indicators of Hispanic ethnicity and race are from two separate questions (Questions 85 and 86, respectively, from the 2004 CAHPS Medicare Satisfaction Survey). Responses for each group (i.e., question) are reported regardless of answers to the other question.

**Table 8.4
Insurance in addition to Medicare**

Categories	Percent
Medigap	8.3
Employer, union, or retiree health coverage	17.9
Veteran's benefits (VA benefits)	1.4
Military retiree benefits (TRICARE)	3.2
Other	26.2
Dually eligible/Medicaid	14.3
Reporting more than one supplemental plan	16.0
No additional insurance	12.7
Missing	0.2

**Figure 8.1
CAHPS composites: Percentage of beneficiaries providing most-positive responses (2000-2004)**



However, the proportion of beneficiaries who reported always getting care quickly during the 5-year period was lower—about three out of five beneficiaries (58 percent) reported no problems getting care quickly in 2004. There were no changes for the Care Quickly composite from 2003 to 2004 (58 percent), but the small differences in results for that composite between the 2003, 2002, 2001, and 2000 surveys may be due to changes in the wording of questions that make up this composite indicator (see *Table 8.5*).

Most-positive responses for the Respectful Treatment composite remained fairly constant over the 5-year period. Throughout the period, approximately four out of five beneficiaries (79 to 80 percent) reported optimal experiences with being treated respectfully by providers and their staff. However, less than two-thirds of beneficiaries provided most-positive responses to the Good Communication composite.

Of the composites, the Medicare Customer Service composite saw the largest drop overall and over any 2-year period (from 2003 to 2004). In 2004, 56 percent of beneficiaries reported most-positive experiences with Medicare customer service, a 6-percentage-point drop from the 62 percent reported in 2003. Beneficiaries responding to questions about customer service are those who made some attempt to seek information.

To examine the decrease in satisfaction with customer service, we looked at whether there was a change in the proportion of beneficiaries responding to these items. We found a 5-percentage-point increase in the proportion of beneficiaries who reported seeking information from Medicare via requests for written materials or via the Internet. Perhaps this added interest was related to beneficiaries' seeking information regarding the 2004 introduction of the Medicare prescription drug discount card and the upcoming initiation of the Medicare Part D prescription drug benefit in 2006. Information seeking rose from 13 percent of beneficiaries who looked for such information in 2003 to 18 percent in 2004. The proportion of beneficiaries reporting that they called Medicare customer service to get information or help also increased, from approximately 9 percent in 2003 to 11 percent in 2004.

Further, we observed a 20-percentage-point increase in the proportion of beneficiaries reporting a small or big problem understanding Medicare information in writing or on the Internet—32 percent of beneficiaries indicated that they had a problem understanding the information in 2003, compared with 52 percent in 2004. Similarly, we found a 22-percentage-point increase in the proportion of beneficiaries reporting problems getting help from Medicare customer service when they called Medicare for information—19 percent of beneficiaries reported problems in 2003, compared with 41 percent in 2004. In addition, there was a 6-percentage-point increase in the proportion of beneficiaries reporting problems with paperwork for Medicare. In sum, the decrease in most-positive responses for the Medicare Customer Service composite appears to be driven by increases in reports of problems for all three of the CAHPS questions that comprise the Customer Service composite.

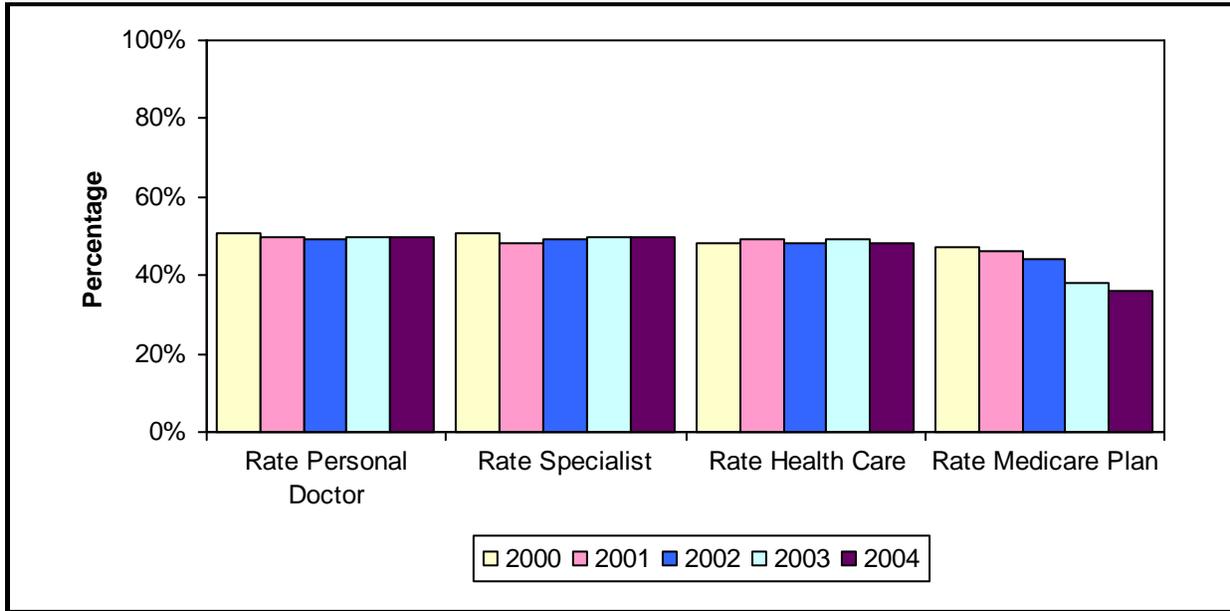
Of the CAHPS composites, the Medicare Customer Service composite fluctuated the most during the 5-year survey period. For example, 64 percent of beneficiaries reported most-positive experiences in 2000, compared with 60 percent in 2001, 65 percent in 2002, 62 percent in 2003, and 56 percent in 2004.

Table 8.5
Question wording changes for Care Quickly composite items (2000-2003)

2000-2001	2002	2003-2004
In the last 6 months, when you called during regular office hours, how often did you get the help or advice you needed?	In the last 6 months, when you called during regular office hours, how often did you get the help or advice you needed?	In the last 6 months, when you called during regular office hours, how often did you get the help or advice you needed?
In the last 6 months, how often did you get an appointment for regular or routine care as soon as you wanted?	In the last 6 months, how often did you get an appointment for health care as soon as you wanted?	In the last 6 months, not counting the times you needed health care right away, how often did you get an appointment for health care as soon as you wanted?
In the last 6 months, when you needed care right away for an illness or injury, how often did you get care as soon as you wanted?	In the last 6 months, when you needed care right away for an illness, injury, or condition, how often did you get care as soon as you wanted?	In the last 6 months, when you needed care right away for an illness, injury, or condition, how often did you get care as soon as you wanted?
In the last 6 months, how often did you wait in the doctor's office or clinic more than 15 minutes past your appointment time to see the person you went to see?	In the last 6 months, how often did you see the person you came to see within 15 minutes of your appointment time?	In the last 6 months, how often were you taken to the exam room within 15 minutes of your appointment?

Approximately half of beneficiaries rated their health care, specialist, and personal doctor a “10” during the 5-year survey period (see *Figure 8.2*). However, ratings of the Medicare health plan were lower overall and decreased substantially over the 5-year period. During the first 3 years of the reporting period, there was a gradual downward trend in best possible ratings of Medicare—47 percent in 2000, 46 percent in 2001, and 44 percent in 2002. The most noteworthy change in the ratings over the survey period was a 6-percentage-point decrease in the proportion of beneficiaries rating the Medicare health plan a “10”—from 44 percent in 2002 to 38 percent in 2003. The sharp downward trend slowed for 2004, with a slight decrease to 36 percent. The cause of the continued downward trend is not clear; however, increased news coverage of Medicare, especially related to Medicare reforms, may have prompted beneficiaries to scrutinize Medicare more closely and thus contributed to the substantial decrease in ratings observed between the 2002 and 2003 surveys. In addition, slight changes in the wording of the survey question corresponding to beneficiary plan ratings (see *Table 8.6*) may have contributed to this trend. Variation in the CAHPS composites can best be observed among states or markets within states. Data for CAHPS results by CMS region, state, and substate areas are available from the 2004 subgroup analysis report (Brody, West, and Bernard, 2005).

Figure 8.2
CAHPS ratings: Percentage of beneficiaries providing ratings of “10” (2000-2004)

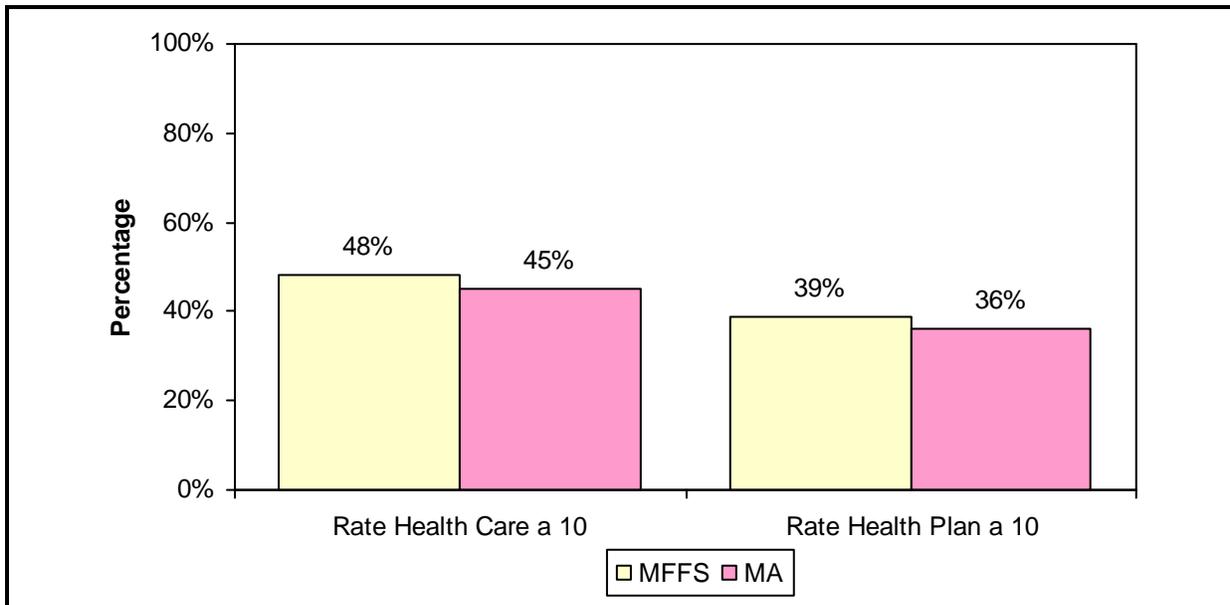


CAHPS indicator results among the MFFS beneficiary population were compared with those of beneficiaries participating in the MA program. When making these comparisons, we included only MFFS results from areas where beneficiaries have a choice of fee-for-service and MA health plans, rather than results from all beneficiaries enrolled in the fee-for-service program. Therefore, the rates observed for the MFFS population in these comparisons differ slightly from those reported for the entire MFFS population. For example, in 2004, 36 percent of beneficiaries rated their health plan a “10,” whereas in areas where beneficiaries have a choice of plans, 39 percent of MFFS beneficiaries rated their health plan a “10” (see *Figure 8.3*).

Table 8.6
CAHPS survey question to assess beneficiary satisfaction with Medicare plan (2000-2004)

-
- 2000 and 2001—How would you rate all your experience with Medicare? Use any number from 0 to 10 where 0 is the worst health plan possible, and 10 is the best health plan possible.
 - 2002—How would you rate all your experience with Medicare? Using any number from 0 to 10 where 0 is the worst health plan possible, and 10 is the best health plan possible, what number would you use to rate your health plan?
 - 2003 and 2004—Using any number from 0 to 10 where 0 is the worst health plan possible, and 10 is the best health plan possible, what number would you use to rate Medicare?
-

Figure 8.3
Comparison between MA and MFSS for CAHPS ratings: Percentage of beneficiaries
providing ratings of “10” (2004)

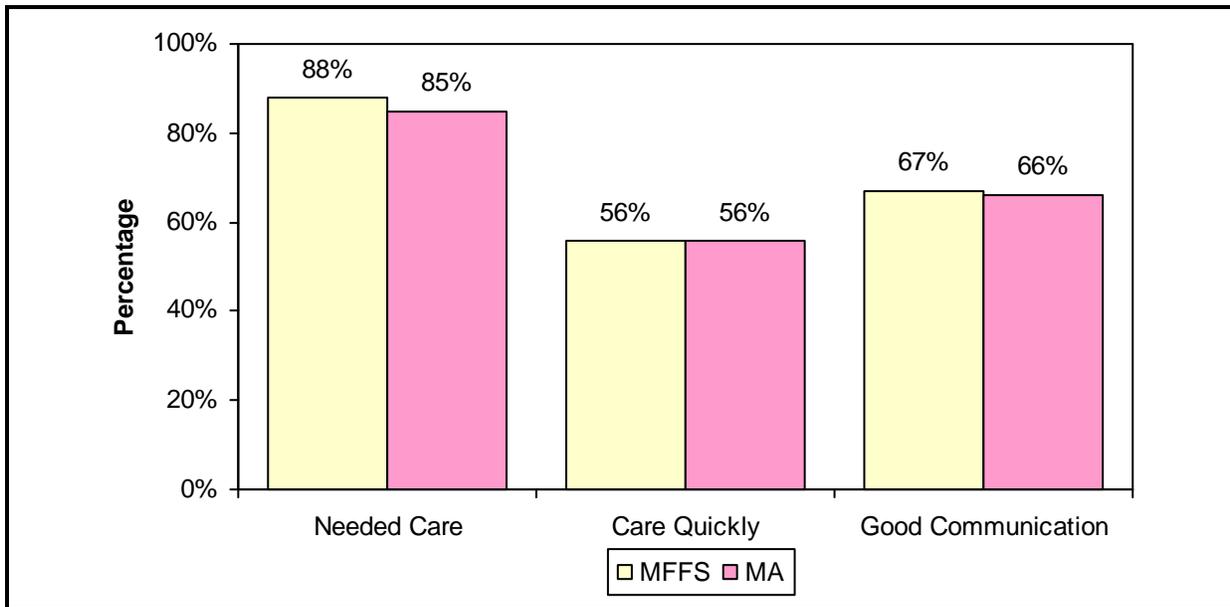


Patient experiences with getting care quickly and good communication were very similar for the MFSS and MA beneficiary populations. By contrast, a higher percentage of MFSS beneficiaries provided most-positive responses to the Needed Care composite during the 5 years, compared with their peers enrolled in MA. For example, in 2004, 88 percent of MFSS beneficiaries reported a most-positive response for getting needed care, compared with only 85 percent of MA beneficiaries (see *Figure 8.4*). MFSS beneficiaries were also slightly more likely than MA beneficiaries to provide the best ratings for their health care and the Medicare health plan. For example, in 2004, 48 percent of MFSS beneficiaries rated their health care a “10,” in contrast to only 45 percent of MA beneficiaries (see *Figure 8.3*).

8.3.2 Sociodemographic Characteristics

2004 Highlights—For most CAHPS composites and ratings, beneficiaries between 18 and 45 years of age were less likely to provide most-positive responses than all other age groups. The only exceptions were the Medicare Customer Service composite and the personal doctor rating: fewer beneficiaries 65 to 69 years of age provided most-positive responses than beneficiaries 18 to 45 years of age. For the Needed Care and Respectful Treatment composites and ratings of the Medicare plan and overall health care in 2004, there was at least a 12-percentage-point difference between the proportion of most-positive responses reported by beneficiaries 80 years of age or older and those in the youngest age group, 18 to 45 years of age. For example, 87 percent of beneficiaries 80 years of age or older provided the most-positive

Figure 8.4
Comparison between MA and MFFS for CAHPS composites: Percentage of beneficiaries providing most-positive responses (2004)



response for the Needed Care composite, compared with only 75 percent of beneficiaries 18 to 45 years of age. For the Medicare plan rating, there was a 25-percentage-point difference for most-positive responses between the oldest age group and youngest age group—48 percent for beneficiaries 80 years of age or older versus 23 percent for beneficiaries 18 to 45 years of age.

Black beneficiaries were generally more likely than White beneficiaries or beneficiaries of other races to provide most-positive responses to CAHPS indicators in 2004. For example, 58 percent of Black beneficiaries rated their personal doctor a “10,” compared with 50 percent of White beneficiaries or 49 percent of other races. There was little to no difference between Whites and Blacks for most-positive responses to the CAHPS composites, with the exception of the Good Communication composite—72 percent of Black beneficiaries provided most-positive responses regarding their communication with providers, compared with only 66 percent of White beneficiaries. However, other races provided a lower percentage of most-positive responses for composites compared with both Whites and Blacks. For example, 78 percent of White beneficiaries and 79 percent of Black beneficiaries provided most-positive responses to the Respectful Treatment composite, compared with only 69 percent of respondents of other races.

CAHPS composite results among Hispanic beneficiaries versus non-Hispanic beneficiaries were mixed. Hispanic beneficiaries provided a higher percentage of most-positive responses than non-Hispanic beneficiaries for the Good Communication and Medicare Customer Service composites, but a lower percentage of most-positive responses for the remaining composites. For all the ratings, Hispanic beneficiaries were more likely than non-Hispanic beneficiaries to provide most-positive responses; a range of 7 to 18 percentage points separated the CAHPS scores reported by Hispanic compared with non-Hispanic beneficiaries. For

example, in 2004, 55 percent of Hispanic beneficiaries rated Medicare a “10,” compared with 37 percent of non-Hispanic beneficiaries.

There was generally an inverse relationship between education and CAHPS ratings and composites. As education level increased among beneficiaries, the percentage of most-positive responses decreased. Although this trend was generally true for the composites, the relationship was more pronounced for the ratings. Specifically, there was a 21- to 28-percentage-point difference between the proportion of most educated and least educated beneficiaries providing most-positive responses for the ratings. For example, 33 percent of beneficiaries with more than a college degree rated their health care a “10” in 2004, whereas almost twice as many beneficiaries (58 percent) with an eighth grade education or less rated their health care a “10.”

Findings From 2000 Through 2004—A similar proportion of male and female MFFS beneficiaries provided most-positive responses to the CAHPS composite indicators, whereas 3 to 5 percent more women provided best possible responses to three of the four CAHPS ratings during the 5-year period. There was a consistent age effect, with younger beneficiaries less likely to report most-positive experiences than older beneficiaries during all 5 years. CAHPS indicator scores similarly varied by education during the 5-year period; less educated beneficiaries were consistently more likely to report most-positive experiences than more educated beneficiaries. Blacks were generally more likely to report most-positive ratings of satisfaction with care compared with Whites and beneficiaries of other races; however, their responses to composites, reflecting experiences with care, were similar to those of Whites. In general, beneficiaries of other races were less likely than White or Black beneficiaries to provide most-positive responses to all questions. Hispanics rated Medicare and their overall health care slightly higher than did non-Hispanics, but there was generally little to no difference in their composite scores during the 5-year period.

8.3.3 Health Status

2004 Highlights—For all indicators, reporting excellent physical and mental health is associated with a higher percentage of most-positive responses compared with those reporting poor physical and mental health. In 2004, there was a 14- to 15-percentage-point difference between the proportion of the healthiest beneficiaries and sickest beneficiaries providing most-positive responses for the Good Communication composite (78 percent vs. 63 percent for physical health perception; 75 percent vs. 61 percent for mental health perception).

The self-reported presence of a chronic illness had little to no impact on composites and ratings. The only notable exception was for the Medicare plan rating, where a smaller percentage of beneficiaries with a chronic illness provided a “10” rating compared with beneficiaries who did not report having a chronic illness (36 percent vs. 42 percent).

Beneficiaries who had been hospitalized overnight at least once during the past year were slightly more likely to rate their specialists a “10”; however, hospitalization during the past year had little effect on other CAHPS scores during the 5 years. In 2004, disability seemed to have no effect on the CAHPS composites, with the exception of Medicare Customer Service—disabled beneficiaries provided a smaller percentage of most-positive responses than did nondisabled beneficiaries (53 percent vs. 57 percent). Disabled beneficiaries gave a slightly higher percentage

of “10” ratings for personal doctor and specialist; however, disability seemed to have no measurable effect on the health care or Medicare plan rating.

Findings From 2000 Through 2004—Across all indicators, there was a strong and consistent association between health status and CAHPS scores; beneficiaries reporting better physical and mental health status were more likely to provide most-positive responses for each CAHPS indicator during the 5 years.

8.3.4 Access to Care

2004 Highlights—Beneficiaries who were dually eligible for Medicare and Medicaid gave higher ratings than those who reported having additional insurance and prescription drug coverage; this was the case for all ratings in 2004. In particular, over half of dually eligible beneficiaries rated Medicare a “10” compared with 34 percent of beneficiaries who had additional insurance and prescription drug coverage. Dually eligible beneficiaries had the same health care experiences as beneficiaries with additional insurance and prescription drug coverage for several indicators. Two notable exceptions include the Needed Care composite, for which dually eligible beneficiaries provided a lower percentage of most-positive responses than beneficiaries with additional insurance and prescription drug coverage (79 percent vs. 88 percent), and Medicare ratings, for which 53 percent of dually eligible beneficiaries provided a rating of “10” in contrast to only 34 percent of beneficiaries with additional insurance and prescription drug coverage.

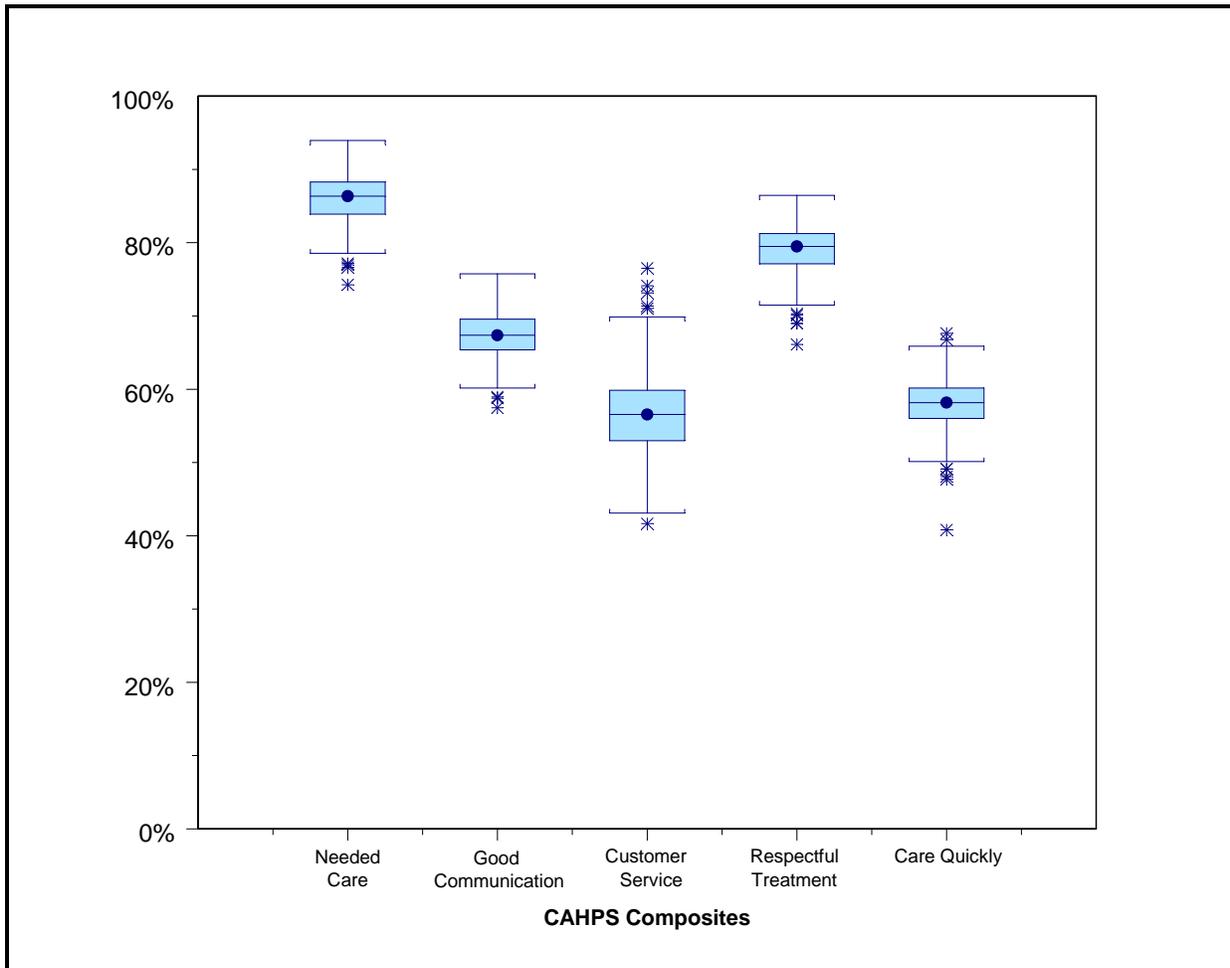
Beneficiaries who reported having a personal doctor were generally more likely to provide most-positive responses, particularly for the composites and the ratings of health care and specialist in 2004. For example, 58 percent of beneficiaries with a personal doctor provided a most-positive response to the Care Quickly composite, compared with 45 percent of beneficiaries without a personal doctor. Ratings of the Medicare plan were not affected by whether beneficiaries reported having a personal doctor.

Findings From 2000 Through 2004—During each of the 5 years, beneficiaries dually eligible for Medicare and Medicaid were more likely to rate their personal doctor, specialist, health care, and Medicare a “10” compared with those who had supplemental health insurance, with or without coverage for prescription drugs. Beneficiaries with supplemental health insurance were most likely to report always getting needed care over the 5 years, whereas dually eligible beneficiaries were most likely to report most-positive responses to the Good Communication composite. Beneficiary experiences with getting care quickly and respectful treatment did not vary by insurance coverage over the 5-year period. The relationship between insurance coverage and customer service was inconsistent during the period. There were no differences by insurance during 2000 and 2001. In 2002 and 2003, dually eligible beneficiaries were most likely to provide most-positive responses to the Customer Service composite, and in 2004 beneficiaries with additional insurance, including coverage for prescription drugs and dually eligible beneficiaries, were most likely to rate their experience with Medicare customer service highly.

8.3.5 Geographic Variation

2004 Highlights—*Figures 8.5 and 8.6* are box and whisker plots that display the variation in percentages of most-positive responses and best possible ratings across CAHPS indicators by geounit. The shaded boxes represent the interquartile range, and the dot within the box represents the median of the distribution. The pair of lines closest to the shaded box approximates the range of observed values, while the asterisks further away from the shaded area represent outliers, values that are more than 1.5 times above or below the interquartile range.

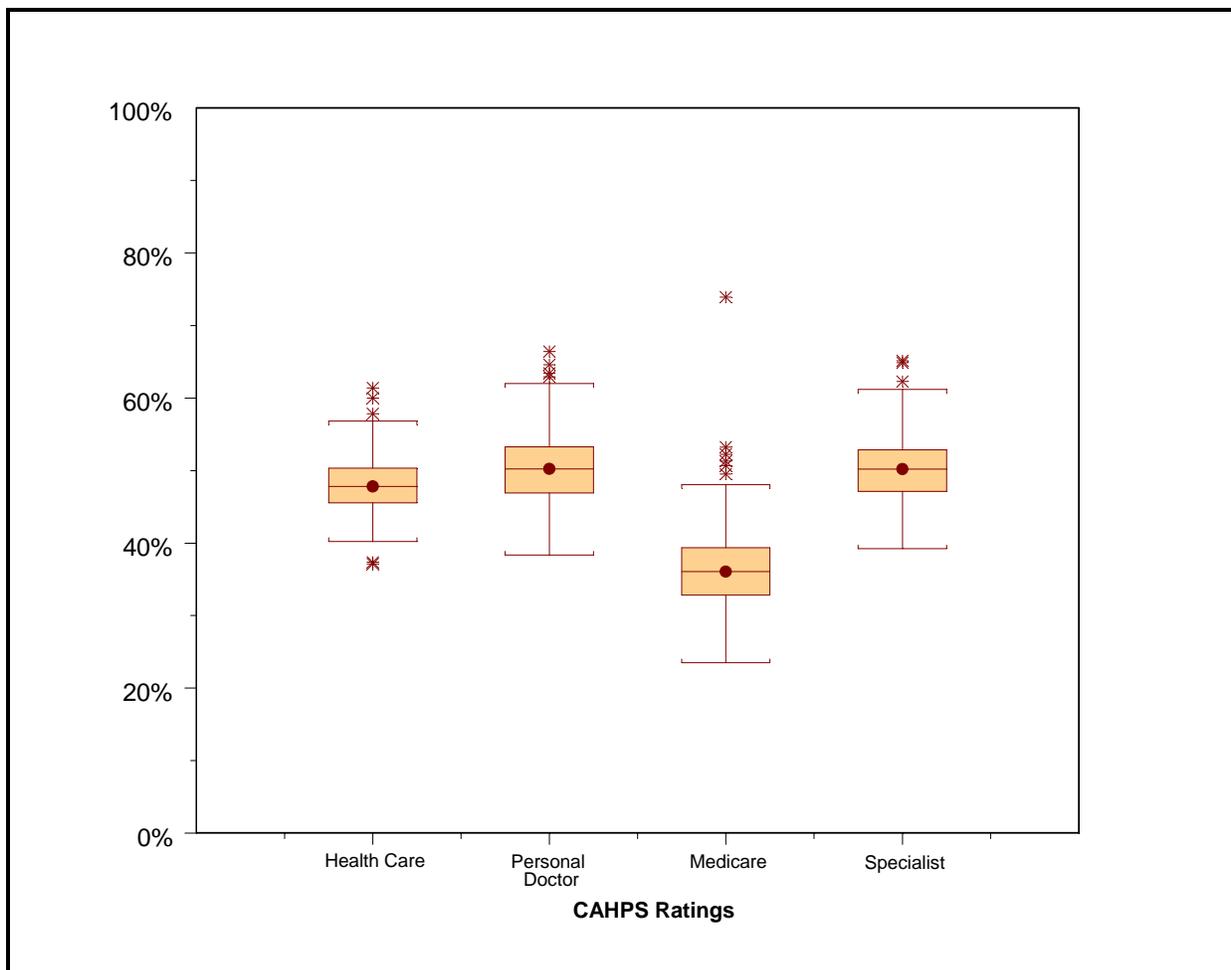
Figure 8.5
Variation in percentage of most-positive responses across CAHPS composites by geounit (2004)



Median percentages of most-positive responses varied across the different composites, ranging from a high of approximately 85 percent for the Needed Care composite to a low of approximately 58 percent for the Customer Service composite. By contrast, the median percentages of best possible ratings among geounits for the ratings were similar. The median percentages of most-positive ratings for three of the ratings were approximately 50 percent, while this figure was approximately 35 percent for rating Medicare.

We noted some small, but not meaningful, regional differences in CAHPS scores. Enrollees residing in Maine, and to a lesser extent other New England states, consistently rated their Medicare experience and satisfaction higher than the national average. On the other hand, beneficiaries residing in the West—particularly Arizona, New Mexico, and Nevada—rated their Medicare experience and satisfaction lower than the national average. Overall, a higher than average proportion of MFBS beneficiaries living in the South provided most-positive responses across all composites compared with people in the West, who provided lower than average ratings on most CAHPS composites. In particular, Alabama, Mississippi, and Louisiana rated their Medicare experience and satisfaction higher than the national average. The one exception to the South providing higher most-positive responses was Florida, which generally reported lower percentages of most-positive responses than the national average.

Figure 8.6
Variation in percentage of best possible CAHPS ratings by geounit (2004)



Findings From 2000 Through 2004—Beneficiaries residing in the Midwest generally rated their Medicare experience and satisfaction consistent with the national average. States in the deep South generally rated their Medicare experience and satisfaction higher than the national average, and states in the Southwest generally rated their experience and satisfaction

lower than the national average. Beneficiaries residing in Puerto Rico provided considerably higher ratings than average for all four CAHPS ratings. This trend was also observed for the Customer Service composite during 2002 through 2004.

8.3.6 Conclusion

In general, CAHPS scores were relatively stable during this 5-year period; however, we observed two noteworthy exceptions. One exception is the rating of the Medicare health plan, which decreased among all MFFS beneficiaries by 6 percentage points from 2002 to 2003 and decreased an additional 2 percentage points in 2004. In addition, a 6-percentage-point decrease in the proportion of most-positive responses was observed for the Medicare Customer Service composite between 2003 and 2004. This decline appears to be driven by an increase in the proportion of MFFS beneficiaries reporting problems with getting information from Medicare via the following: (1) written material and the Internet; (2) the telephone; and (3) problems experienced with paperwork for Medicare—that is, all three CAHPS survey questions that comprise the Customer Service composite. These declines in Medicare ratings and an increase of reported problems with Medicare customer service may be related to increased information seeking by Medicare beneficiaries related to the introduction of Medicare prescription drug discount cards in 2004 and the upcoming initiation of the Medicare Part D prescription drug benefit in 2006. For whatever reason, there were reported increases in proportions of beneficiaries seeking information about Medicare or calling for such information by phone.

8.4 Supplemental Analysis: Relationship Between CAHPS Scores and Disability

8.4.1 Objective

The purpose of this supplemental analysis is to examine patterns of reported experience with health care services among a population of disabled MFFS beneficiaries as measured by self-reported inability to perform activities of daily living (ADL). Beginning in 2003, the CAHPS survey added a question asking beneficiaries about their ability to perform ADLs. Furthermore, in 2004 the CAHPS survey added a series of questions asking beneficiaries about their experiences with prescription drug coverage and costs. The addition of these questions permits assessment of the effects of disability and prescription drug costs on beneficiaries' health care experiences in the Medicare program. We give particular attention to beneficiaries who report difficulties performing ADLs, since we hypothesized that these ADL-disabled beneficiaries experience more problems with their health care than healthier beneficiaries.

For this analysis, we model the effect of ADL disability on health care measures such as experience with needed care, prescription drug treatment, and customer service. We also investigate the interaction of disability and out-of-pocket prescription drug costs to better understand how these factors work together in explaining different beneficiary experiences.

8.4.2 Methods

Data and Variable Construction—We used data from the 2004 MFFS survey. We constructed two analysis variables: a three-category disability variable based on the ADL survey question and a six-category prescription drug cost variable based on two prescription-related survey variables. The survey question used to create the ADL disability variable asked if the

respondent had difficulty or was unable to perform any of the following ADLs due to a health or physical condition: (1) bathing, (2) dressing, (3) eating, (4) getting in or out of chairs, (5) walking, and (6) using the toilet. Three categories for the disability variable are as follows:

- No ADL limitations—Respondents reporting no difficulties for any of the ADLs.
- Mild ADL limitations—Beneficiaries having difficulty with one or two ADLs.
- Severe ADL limitations—Respondents reporting that they were unable to perform any of the ADLs or had difficulty performing three or more of the ADLs.

The six categories for the prescription drug cost variable were created on the basis of responses to two survey questions. The first question asked beneficiaries if they needed any new prescription medicines or a prescription refill in the last 6 months. The second question asked how much, on average, the beneficiary spent each month on prescription medicines with the following responses: (1) Nothing; (2) Between \$1 and \$50; (3) Between \$51 and \$100; (4) Between \$101 and \$200; (5) Between \$201 and \$300; and (6) More than \$300. Survey respondents who did not need any new prescription medicines or need to refill any prescriptions were coded as “No need for prescription drug costs.” (The covariates with their levels used in the model are listed in **Table 8.7** and denoted with an asterisk. Proxy help and survey answer proxy help are two covariates included in the model that are not listed in the table.)

Statistical Methods—Our goal was to model the questions that constitute the CAHPS composites and the survey questions addressing beneficiary experiences with prescription drugs adjusting for various beneficiary characteristics.¹ **Table 8.8** shows the survey questions that constitute the five CAHPS composites. The effects of disability were of specific interest. We also wanted to further explore the interaction between prescription drug costs and disability; hence, we included both variables in the models in addition to the interaction. We used the following logistic regression model for the response measures:

$$\text{logit}(y_{hij} = 1 \mid \text{Disability}, \text{PrescriptionCost}, \mathbf{x}) = a + \text{Disability}_h + \text{PrescriptionCost}_i + \text{Disability} * \text{PrescriptionCost}_{hi} + \beta \mathbf{x}_{hij} + \varepsilon_{hij}$$

where

$\text{PrescriptionCost}_i$ represents the effect of the i th prescription cost,

Disability_h represents the effect of the h th disability,

y_{hij} represents the response vector for a composite or scalar for a rating for the j th individual,

\mathbf{x}_{hij} represents a vector of covariates for the j th individual,

¹ The statistical models for prescription drug experiences dropped all beneficiaries who had no need for a new or refilled prescription. These beneficiaries replied either “No” to the question asking if they needed any prescriptions or “None” to the question asking how many different prescription medicines they received. The category “No need for prescription drug costs” in the prescription cost variable was also removed.

ϵ_{hij} represents the residual vector for a composite or scalar for a rating for the j th individual (for the composites, these residuals are not assumed independent), and

β represents the regression coefficients for the covariates.

The response variables (i.e., the CAHPS composites and prescription drug questions), denoted as y_{hij} in the above model, were transformed into 0/1 binary variables with 1 corresponding to problems. For the questions asking how much of a problem beneficiaries experienced with an aspect of their health care, the responses “A big problem” or “A small problem” were set to 1. Similarly, for questions asking beneficiaries how often they received some type of good service, the responses “Never” and “Sometimes” were also set to 1. For the question asking beneficiaries how worried they were about being able to afford their prescription medicines, the responses “Very worried” or “Somewhat worried” were set to 1. Similarly, for the question asking if a beneficiary had delayed getting prescriptions, the response “Yes” was set to 1. All other nonmissing responses were coded to a 0, enabling us to model the percentage of problem responses.

Disability and the interaction between disability and prescription drug costs were our independent variables of interest. For measures exhibiting a statistically significant disability-by-prescription drug cost interaction, we explored the effects of disability at each level of prescription drug cost through predicted margins. The models not exhibiting a significant interaction were rerun without the interaction term, and the prescription drug cost variable remained in the model as a covariate. We set “No ADL limitations” as the reference level for the disability variable, allowing us to compare beneficiaries with no ADL limitations to mild and severe limitations. All tests used an adjusted Wald F test and were performed at an alpha level of .05.

The covariates (i.e., the variables that make up x_{hij}) used in our models were age, gender, education, race, ethnicity, self-reported health, self-reported mental health, proxy assistance, whether the beneficiary had a personal doctor, and type of supplemental insurance (including Medicaid).

We used SUDAAN[®], a software package specifically designed to provide accurate analyses of weighted, cluster-correlated survey data, for all of our analyses. We used the logistic regression procedure in SUDAAN to analyze the data and correctly account for the modeling issues detailed above. We elected to use a with-replacement design because the percentage of people sampled within a given stratum was very small. We used Generalized Estimating Equations (GEE) (Binder, 1983; RTI International, 2004) to calculate the variance for all of the models we examined. The GEE procedure is capable of accounting for the positive intraperson correlation when estimating variances. For the prescription drug experience measures, there is only one response per person; thus, there is no clustering of responses.

Table 8.7
Characteristics of the MFFS population (2004)

Characteristic	No ADL limitations (n = 62,290)	Mild ADL limitations (n = 23,414)	Severe ADL limitations (n = 14,698)
Sociodemographics			
<i>*Education</i>			
Less than high school graduate	20.9	29.3	40.6
High school graduate or some college	56.5	55.2	47.4
4-year college graduate	10.0	7.1	5.9
More than college graduate	12.6	8.5	6.2
<i>*Race</i>			
White	89.6	87.8	85.1
Black	6.6	8.6	10.7
Other	3.8	3.6	4.3
<i>*Ethnicity</i>			
Hispanic	5.4	5.8	8.8
<i>*Gender</i>			
Female	54.5	61.7	64.4
<i>*Age</i>			
65-69	30.8	21.1	15.5
70-74	26.7	22.3	17.6
75-79	21.2	22.3	19.5
80+	21.4	34.3	47.4
Health Status			
<i>*Self-reported general health status</i>			
Excellent	10.0	1.5	1.1
Very good	32.3	10.0	4.8
Good	39.3	34.3	18.4
Fair	16.9	43.6	43.6
Poor	1.5	10.6	32.1
<i>*Self-reported mental health status</i>			
Excellent	30.3	17.4	10.0
Very good	35.7	29.9	19.0
Good	27.1	35.2	31.8
Fair	6.4	15.0	27.0
Poor	0.6	2.6	12.2
Access to Care			
<i>Overnight hospitalization in the last 6 months</i>			
Yes	15.2	27.4	41.2
<i>*Personal doctor</i>			
Yes	89.6	91.4	90.4

(continued)

Table 8.7
(continued)

Characteristic	No ADL limitations (n = 62,290)	Mild ADL limitations (n = 23,414)	Severe ADL limitations (n = 14,698)
*Insurance status			
Dually eligible	7.0	13.5	24.6
Coverage with Rx	54.7	48.7	40.0
Coverage without Rx	28.4	27.1	23.5
No additional insurance	10.0	10.7	11.9
*Prescription drug cost			
Nothing	5.0	6.2	11.5
Between \$1 and \$50	33.3	28.5	23.7
Between \$51 and \$100	17.8	19.4	15.4
Between \$101 and \$200	13.6	17.5	16.6
More than \$200	9.3	16.5	20.9
No need	21.1	11.9	11.9
Health Care Use			
Seen specialist			
None	44.3	32.2	32.5
1-2	35.8	35.8	31.4
3-4	13.0	19.0	19.6
5 or more	7.0	13.1	16.6
Seen personal doctor			
None	23.4	13.8	16.0
1-2	44.0	37.5	31.4
3-4	19.5	25.2	25.5
5 or more	13.1	23.6	27.2
Emergency room visits			
None	86.7	77.1	64.6
1-2	12.4	20.4	29.1
3-4	0.8	2.0	5.0
5 or more	0.2	0.5	1.4
Number of prescriptions			
None	1.5	1.2	0.9
1-2	33.5	18.9	14.6
3-5	43.4	40.8	34.5
6 or more	21.6	39.2	50.0

NOTE: Asterisks indicate the covariates selected to include in the logistic regression model.

Table 8.8
CAHPS composites and associated survey questions

CAHPS measure	Survey question	Response scale
Questions constituting the CAHPS Getting Needed Care composite (Needed Care)	How much of a problem, if any, was it to get a personal doctor or nurse you are happy with?	1 A big problem 2 A small problem 3 Not a problem
	How much of a problem, if any, was it to see a specialist that you needed to see?	
	How much of a problem, if any, was it to get the care you or a doctor believed necessary?	
Questions constituting the CAHPS Good Communication composite (Good Communication)	How much of a problem, if any, were delays in health care while you waited for approval from Medicare?	
	How often did doctors or other health providers listen carefully to you?	1 Never 2 Sometimes 3 Usually 4 Always
	How often did doctors or other health providers explain things in a way you could understand?	
	How often did doctors or other health providers show respect for what you had to say?	
Questions constituting the CAHPS Staff Respectful Treatment composite (Respect)	How often did doctors or other health providers spend enough time with you?	
	How often did office staff at a doctor's office or clinic treat you with courtesy and respect?	1 Never 2 Sometimes 3 Usually 4 Always
Questions constituting the CAHPS Getting Care Quickly composite (Care Quickly)	How often were office staff at a doctor's office or clinic as helpful as you thought they should be?	
	When you called during regular office hours, how often did you get the help or advice you needed?	1 Never 2 Sometimes 3 Usually 4 Always
	How often did you get an appointment for regular or routine health care as soon as you wanted?	
Questions constituting the CAHPS Customer Service composite (Customer Service)	When you needed care right away for an illness or injury, how often did you get care as soon as you wanted?	
	How often were you taken to the exam room within 15 minutes?	
	How much of a problem, if any, did you have with paperwork for Medicare?	1 A big problem 2 A small problem 3 Not a problem
	How much of a problem, if any, was it to find or understand this information?	
	How much of a problem, if any, was it to get the help you needed when you called Medicare customer service?	

8.4.3 Results

In regard to sociodemographic and health characteristics of survey respondents by each ADL level, beneficiaries with at least some degree of ADL limitations were more likely to be less educated, female, and older. As expected, beneficiaries reported worse general and mental health as their level of ADL functioning worsened. As ADL functioning worsened, beneficiaries were also more likely to be dually eligible for Medicaid and Medicare, have no supplemental insurance coverage, and have considerably higher health care utilization.

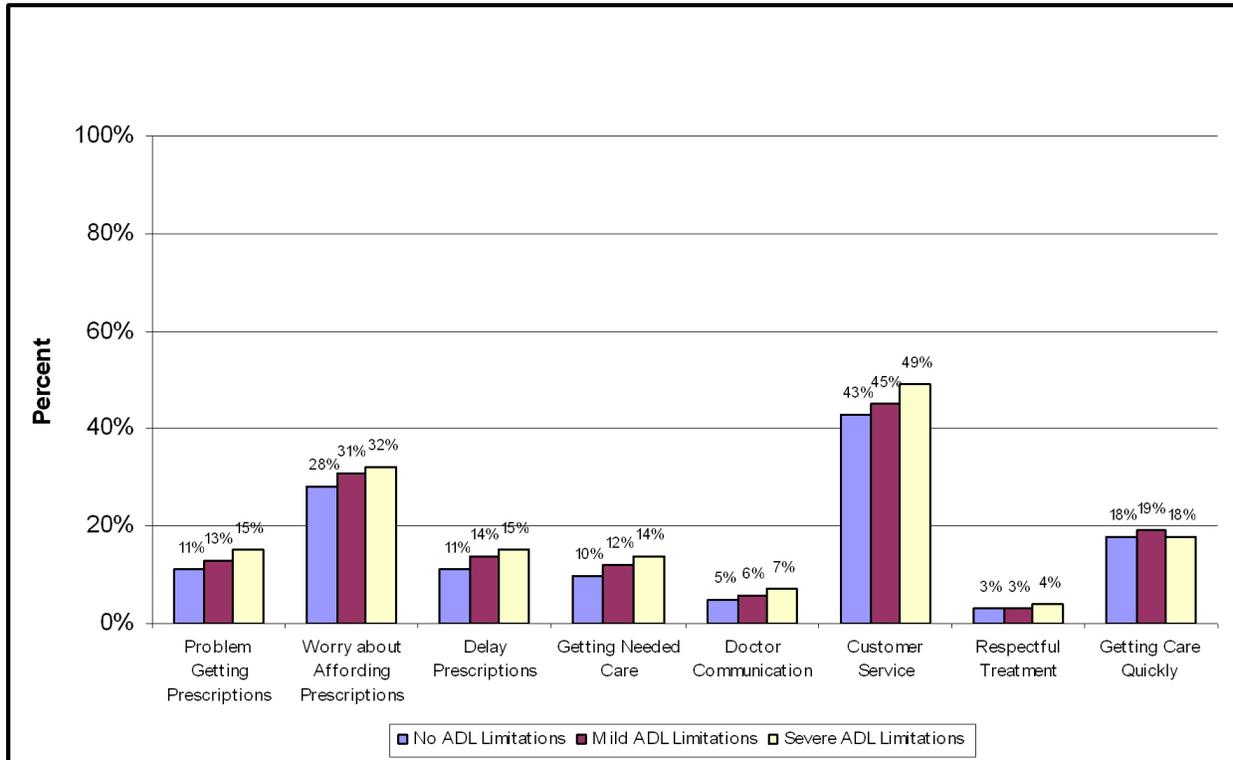
Regardless of disability, the percentage of beneficiaries reporting problems with their health care as measured by the composites is fairly low. This is especially true for the Respectful Treatment and Good Communication composites—the percentage of beneficiaries reporting problems for these composites does not exceed 7 percent. The percentage of beneficiaries reporting problems for the Care Quickly and Needed Care composites as well as the percentage of beneficiaries delaying their prescriptions and the percentage having problems getting their prescriptions is somewhat higher, ranging from 10 to 19 percent. The percentages of beneficiaries who worry about affording their prescription medications and of those who report problems with customer service are considerably higher, ranging from 28 to 49 percent.

The effects of disability were statistically significant for all of the measures. In general, as disability increased, the percentage of beneficiaries reporting problems in the composites and prescription drug experiences increased. As shown in *Figure 8.7*, the largest overall difference was for the Customer Service composite, where 43 percent of beneficiaries with no ADLs reported problems, compared with 49 percent for beneficiaries with severe ADLs. For the Respectful Treatment, Good Communication, and Care Quickly composites, however, the difference was 2 percentage points or less.

Among beneficiaries with no ADL limitations, about 11 percent delayed or did not get their needed prescriptions because of cost. By contrast, cost was a barrier to getting prescriptions among 15 percent of beneficiaries with severe ADL limitations. Similar results were found for the percentage of beneficiaries reporting problems getting needed prescriptions. For the Needed Care composite, 10 percent of beneficiaries with no ADL limitations had problems, followed by 12 percent among beneficiaries with mild ADL limitations and 14 percent among beneficiaries with severe ADL limitations. Among beneficiaries with no ADL limitations, 28 percent worried about not being able to afford their prescription medicines, compared with 32 percent of beneficiaries with severe ADL limitations.

We tested the interaction between disability and prescription cost, allowing us to investigate if the effects of disability depended on a beneficiary's average monthly prescription costs. The interaction was significant for two outcomes: Problem Getting Prescriptions and the Customer Service composite. For the remaining outcomes, we removed the interaction term from the models but retained the prescription drug cost variable as a covariate and reran the analysis.

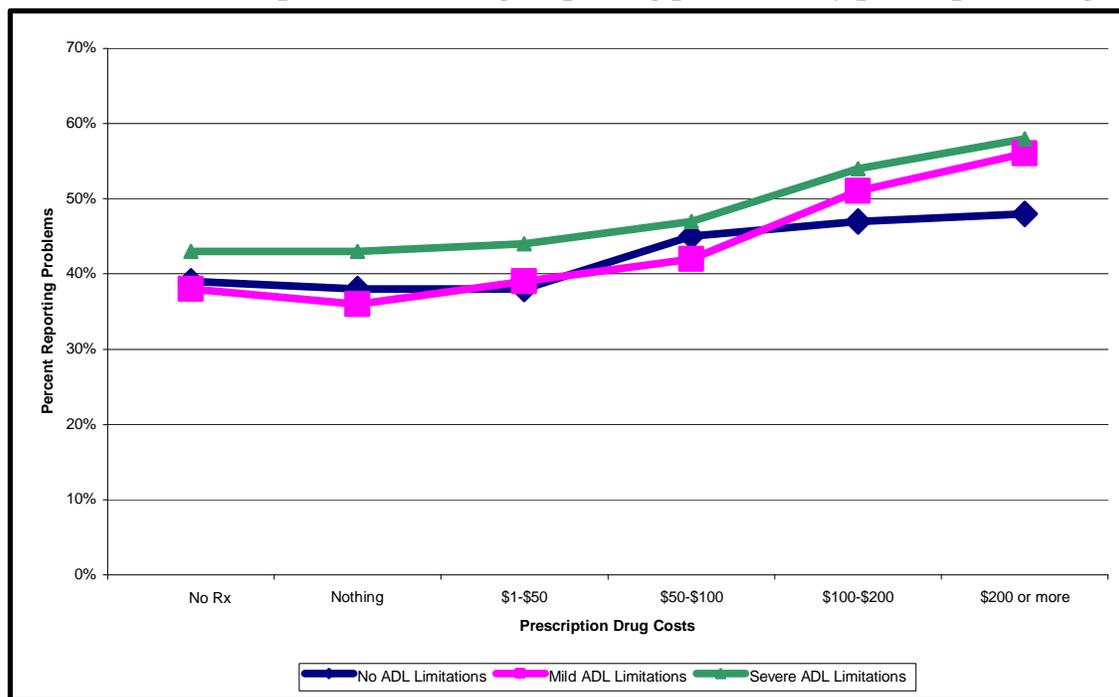
Figure 8.7
Beneficiary health care experiences by disability, adjusted for case-mix covariates



Results of Disability-by-Prescription Cost Interaction—The disability-by-prescription cost interactions for the Customer Service composite and Problem Getting Prescriptions measure are shown in *Figures 8.8 and 8.9*. For both measures, across the different levels of prescription drug costs, beneficiaries with severe ADL limitations have more problems than beneficiaries with no ADL limitations. Beneficiaries with severe ADLs and \$200 or more in average monthly prescription drug costs report the most problems with getting prescriptions and customer service.

The results are not as consistent among beneficiaries with mild ADL limitations and no ADL limitations. For the Customer Service composite, the percentage of beneficiaries reporting more problems inverts between no ADL limitations and mild ADL limitations as prescription drug costs increase. The percentage of beneficiaries with no prescription drug costs reporting problems getting their prescriptions is the same for beneficiaries with no ADL limitations as for those with mild ADL limitations; however, as prescription costs increase, beneficiaries with mild ADL limitations report more problems than beneficiaries with no ADL limitations.

Figure 8.8
Customer Service composite: Percentage reporting problems, by prescription drug costs

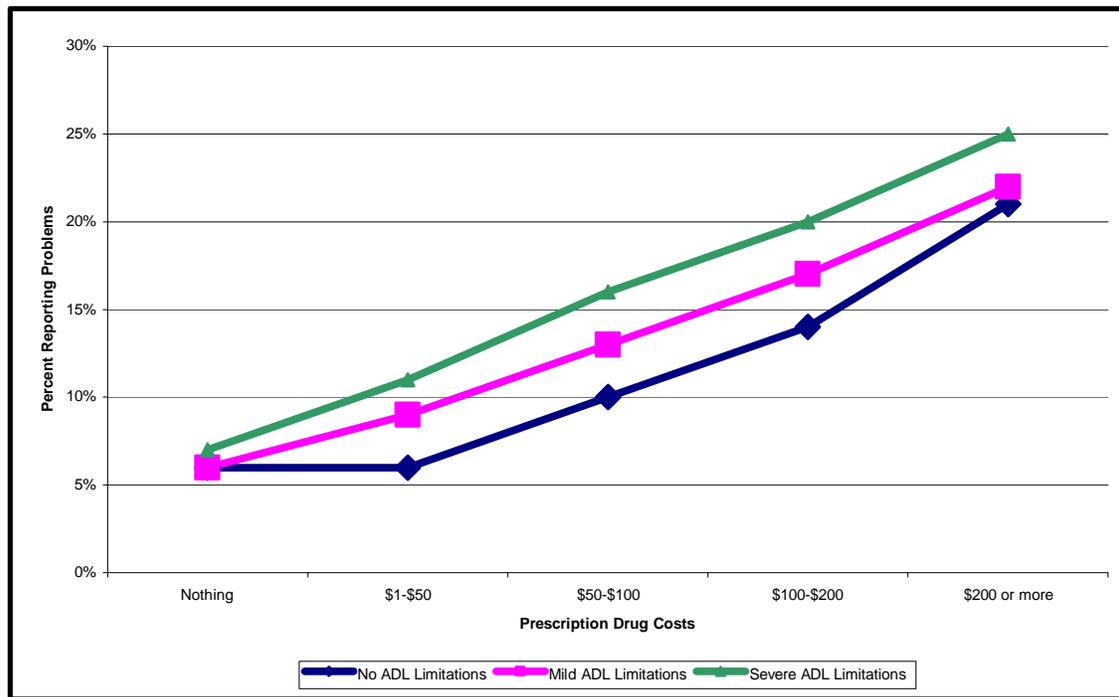


8.4.4 Policy Implications

These results reflect findings from a growing body of literature that suggests persons with disabilities have different experiences with their health care than persons without activity limitations. Among MFFS beneficiaries, those with ADL limitations report greater problems accessing needed prescription medications and needed care, greater problems with customer service, and more delays getting prescription medications because of cost. Beneficiaries with disabilities were more likely to report that they are worried about being able to afford needed prescription medication over the next year.

Further research is needed to examine the impact of these differences in perceived access on the quality of health care and outcomes for the disabled. Providers, researchers, and policy makers should look for innovative approaches to delivering care for the disabled.

Figure 8.9
Problem getting prescriptions: Percentage reporting problems, by prescription drug costs



8.5 Supplemental Analysis: Medicare Beneficiary Experiences of Accessing Prescription Drugs

8.5.1 Objective

Prescription drug use among the Medicare population has increased dramatically in recent years, particularly given both the potential and realized success of using prescription medication to prevent and treat chronic illness and disease. The growing demand for prescription drugs among the elderly and disabled in Medicare gives policy makers an enormous challenge to ensure that these medication treatments are affordable and accessible, particularly for our most vulnerable populations. Hence, attention should be given to the attitudes and experiences of Medicare beneficiaries who use prescription drugs in the traditional fee-for-service program.

This supplemental analysis presents findings from the 2004 CAHPS MFFS and MA surveys. We analyzed several questions from the surveys to provide a detailed view of beneficiary experiences and attitudes related to prescription drug access.

8.5.2 Methods

Data from the 2004 MFFS survey and the 2004 MA survey were used for the analysis. As detailed in the preceding chapters of this report, the MFFS survey is a stratified random sample with 276 geographic areas, covering all U.S. counties, the U.S. Virgin Islands, and Puerto Rico. The sample frame comprised over 30 million beneficiaries who were enrolled in fee-for-service Medicare for at least the prior 6 months and resided in any state in the United States, the District

of Columbia, the Virgin Islands, or Puerto Rico. The sample frame was obtained from the CMS EDB. The MA survey is also a stratified random sample, but instead of geographic strata, strata are created from the 173 MA plans and continuing cost contracts. Larger plans were divided, and the end result was a survey with 286 sampling units. MA plans with contracts in effect on or before July 1, 2003, were eligible for the survey, and beneficiaries enrolled in one of the plans for at least 6 months were eligible for the survey. In 2004, there were 117,102 MFFS survey respondents (66.9 percent response rate) and 132,803 MA survey respondents (79.7 percent response rate).

The two surveys were concatenated to form an analysis file. Dually eligible beneficiaries and those living in long-term care facilities were removed from the analysis file. Beneficiaries reporting that they did not get any prescription medicines were also removed from the file.¹ The final analysis file consists of 101,344 MFFS respondents and 121,234 MA respondents for a total of 222,578 survey respondents.

Measures of Prescription Drug Use and Access—We focused our analysis on the following seven questions in the CAHPS surveys about patient experiences obtaining prescription drugs:

- In the last 6 months, did you need any new prescription medicines or need to refill a prescription?
- In the last 6 months, how many different prescription medicines did you get or have refilled?
- About how much, on average, do you pay each month for prescription medicines that you take?
- In the last 6 months, how much of a problem, if any, was it to get the prescription medicine you needed?
- In the last 6 months, did you delay getting or did not get a prescription medicine that you needed because you felt that you could not afford it?
- Do you have any other health insurance that pays at least some of the costs of medicines prescribed by doctors or other health providers?
- How worried are you that you will not be able to afford the prescription medicines that you need over the next year?

We constructed an analysis variable describing the beneficiary's insurance type and prescription drug coverage. The variable consists of the following five levels:

¹ Information about receipt of prescription drugs was obtained from responses to the MFFS and MA survey question, "In the last 6 months, how many different prescription medicines did you get or have refilled?"

1. MFFS with supplemental prescription drug coverage
2. MA with prescription drug coverage
3. MA without prescription drug coverage
4. MFFS with no additional insurance or prescription drug coverage
5. MFFS with additional insurance coverage that does not include benefits for prescription drug coverage

MFFS beneficiaries were assigned to categories 1, 4, or 5 on the basis of responses to survey questions 1, 2, and 46 on the MFFS survey instrument. MA beneficiaries were assigned to categories 2 or 3 on the basis of responses to survey questions 46 and 47 on the MA survey instrument.

Statistical Methods—We created frequency tables of all variables of interest and cross-tabulations of beneficiary characteristics and responses to questions related to the number and cost of drugs used per month during the past 6 months. We used logistic regression to model three outcomes related to beneficiary experiences with prescription drugs. Specifically, we examined the beneficiary characteristics related to responses to the following survey questions:

- Question 44. In the last 6 months, how much of a problem, if any, was it to get the prescription medicine you needed? (A big problem, A small problem, Not a problem)
- Question 45. In the last 6 months, did you delay getting or did not get a prescription medicine that you needed because you felt that you could not afford it? (Yes, No)
- Question 47. How worried are you that you will not be able to afford the prescription medicines that you need over the next year? (Very worried, Somewhat worried, A little worried, Not at all worried)

For Questions 44 and 47, the response variables were transformed into dichotomous variables, distinguishing beneficiaries who experienced any problem from those who experienced no problems. For example, individuals who responded that they were “Very worried,” “Somewhat worried,” or “A little worried” were grouped together. Similarly, for Question 44, the beneficiaries responding “A big problem” or “A small problem” were grouped together. Logistic regressions were modeled to predict the presence of delay, problems, and worry.

The covariates used in our models were age, gender, education, race/ethnicity, self-reported health, self-reported mental health, self-reported health care rating compared to 1 year ago, proxy assistance, self-reported use of emergency room during past year, and need for help with routine events.

As in the supplemental analysis described in Section 8.4, we used the software package SUDAAN for all of our analyses. We used the logistic regression procedure in SUDAAN to analyze the data and correctly account for the design of the surveys. We elected to use a with-

replacement design because the percentage of people sampled within a given stratum was very small. We used GEE to calculate the variance for all of the models we examined.

8.5.3 Results

Characteristics of Respondents—Eighty-seven percent of beneficiaries received MFFS benefits, and 12 percent of beneficiaries were enrolled in an MA plan during 2004. Almost 50 percent of the Medicare population received MFFS benefits and had supplemental prescription drug coverage, whereas only 10 percent of the population were enrolled in a managed care plan and had prescription drug insurance coverage. One in four beneficiaries were in MFFS with additional insurance coverage that did not include prescription drugs, and 13 percent of the population were in MFFS and had no additional insurance.

Approximately 55 percent of the Medicare population were female. A majority of beneficiaries (57 percent) were between 65 and 79 years of age, one-third of the population were under 65, and 10 percent of the population were 80 years of age or older. Based on data from survey responses, 85 percent of the population were White, 7 percent were Black, 5 percent were Hispanic, 2 percent were Asian or Pacific Islanders, and 1 percent were American Indians or Alaska Natives. Approximately 22 percent of beneficiaries had less than a high school education, 36 percent graduated from high school, and 42 percent attended at least some college. Eight percent of beneficiaries received assistance completing the CAHPS survey, and 6 percent of surveys were answered by proxy respondents.

Most beneficiaries self-reported that they were in at least good health physically (64 percent) and mentally (86 percent) and reported that their health is about the same as a year ago (60 percent). Only 15 percent of beneficiaries reported that their health is at least somewhat better than a year ago, whereas 26 percent reported that their health was at least somewhat worse than a year ago. Only 20 percent of the population reported needing assistance with routine needs. Almost one in five beneficiaries reported having at least one emergency department visit during the past year.

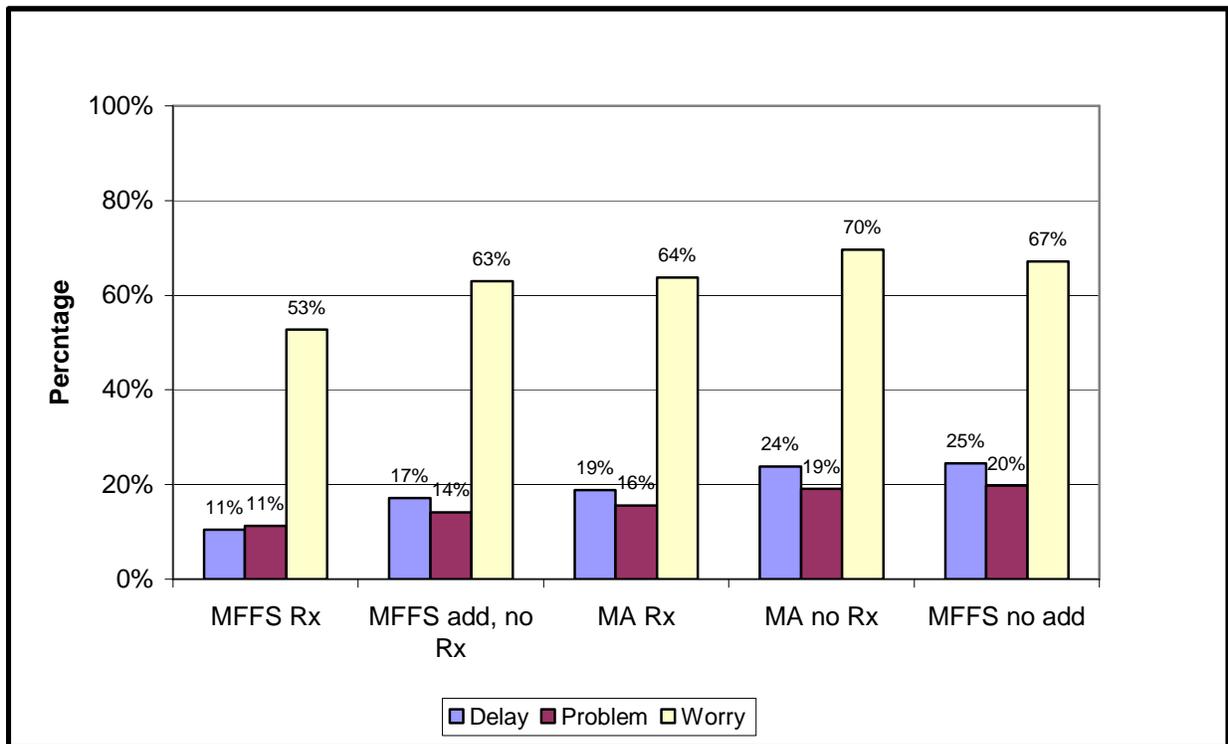
Access to Prescription Medicine—Overall, the vast majority of Medicare beneficiaries (83 percent) reported needing prescription drugs, almost three-quarters of whom reported getting three or more different prescriptions during the past 6 months. Sixty percent of beneficiaries reported paying between \$1 and \$100 for prescriptions each month. An additional 28 percent reported spending between \$101 and \$300 each month, and 7 percent reported spending more than \$300 per month for prescription medicine. The remaining fewer than 5 percent of beneficiaries reported paying nothing despite reporting obtaining one or more prescriptions in the past 6 months. In general, a small percentage of beneficiaries reported problems getting needed medications (14 percent) or delay getting a prescription medicine because of affordability (15 percent). By contrast, 58 percent of beneficiaries reported being at least a little worried about being able to afford prescription medicines that they would need over the next year.

Insurance Coverage—The results of the logistic regression models showed that, controlling for a variety of sociodemographic and health status variables, insurance type and prescription drug coverage were significantly related to beneficiary reports of problems accessing needed prescription medicines, delays in obtaining medicines due to cost, and worry

about the affordability of prescription drugs over the next year. Compared with MA enrollees who had prescription drug coverage, MFFS beneficiaries were less likely to report problems, delays, or worry about prescription drugs. Similarly, MFFS beneficiaries with additional insurance that did not cover prescription drugs were less likely to report problems and delays than MA enrollees with prescription drug coverage. MA enrollees and MFFS beneficiaries with no additional insurance were significantly more likely to report problems, delays, and at least a little worry about the affordability of their drugs during the next year compared with MA enrollees who had coverage for prescription medicines.

A graph of the predicted marginals produced by the regression models illustrates these results (see **Figure 8.10**). Adjusting for the other factors in the model, 16 percent of MA enrollees with prescription coverage reported problems accessing prescription drugs, compared with only 11 percent of MFFS beneficiaries with prescription coverage and 14 percent of MFFS beneficiaries with additional insurance that does not cover prescriptions. By contrast, approximately one in five MA enrollees with no prescription coverage and MFFS beneficiaries without supplemental insurance benefits reported problems getting needed drugs.

Figure 8.10
Adjusted percentages (predicted marginals) for problem, delay, and worry by plan type



Prescription Drug Cost and Number—In addition, as expected, there was a significant relationship between beneficiary experiences accessing prescription drugs and the cost of prescriptions needed each month. As the amount paid for prescriptions each month increases, the likelihood of reporting problems, worry, and delay also increases. The relationship observed between the number of prescriptions needed each month and the outcomes of interest is less

clear. Beneficiaries who reported getting three or more prescriptions per month during the past 6 months were approximately 50 percent more likely to report problems getting drugs than those who needed only one or two drugs during the months. However, beneficiaries needing three or more drugs were slightly less likely to delay getting prescriptions due to cost or to worry about the affordability of their drugs for the next year than their counterparts needing only one or two medicines per month.

Sociodemographic Characteristics—In general, male beneficiaries were less likely than female beneficiaries to report problems, worry, or delay. We observed that age was indirectly related to the outcome variables; as age increases, beneficiaries were less likely to report problems, worry, or delay. Overall, beneficiaries who have at least a high school diploma report less worry and delay than those with less than a high school education. Those with some college were not significantly different from those with less than a high school education regarding reported problems. College graduates reported more problems than those with less than a high school education.

Hispanic and Black beneficiaries reported more problems, worry, and delay than Whites. Native Americans and Alaska Natives reported more problems and delays getting drugs compared with Whites, whereas Asians' and Pacific Islanders' experiences did not differ significantly from that of Whites. Beneficiaries with a proxy respondent were less likely to report worry and delay but did not differ from beneficiaries who received no help from a proxy regarding reports of problems; however, beneficiaries who received help from a proxy were more likely to report problems and worry and less likely to report delays.

Health Status—There is a linear relationship between self-reported health and anticipated problems with accessing prescription drugs. Beneficiaries self-reporting excellent or very good physical and mental health status were less likely to report having problems, delays, or worry about prescription drugs than those in good health. By contrast, beneficiaries in fair or poor health were more likely to report problems, delay, or worry than those in good health. Interestingly, those beneficiaries reporting no change in health status during the past year were less likely to report problems, delays, or worry than those reporting that their health was either better or worse than the past year. As expected, beneficiaries who reported going to the emergency room at least once during the past year and those who need help with routine activities were more likely to report problems, worry, and delay.

Summary—Regardless of insurance type, a majority of Medicare beneficiaries are concerned and worried about their ability to obtain prescription drugs. Those expressing the least worry were the beneficiaries in MFFS with a supplemental plan that included prescription drug coverage.

8.6 Supplemental Analysis: Relationship Between Depression and Health Care Utilization and CAHPS Indicators Among MFFS Beneficiaries With Diabetes

8.6.1 Objective

During the past year, we examined whether depression is related to health care utilization and CAHPS indicators among MFFS beneficiaries with diabetes. The health care service utilization outcomes of interest included the following:

- Potentially avoidable hospital admissions or emergency department visits for diabetes and congestive heart failure during the year following the CAHPS survey
- Total health care costs during the year following the CAHPS survey
- Any inpatient admission during the year following the CAHPS survey
- Receipt of preventive services, such as lipid profile, during the year following the CAHPS survey

We hypothesized that among MFFS beneficiaries with diabetes, those with depression would be more likely than those without depression to have hospital admissions and higher health care costs and would be less likely to receive preventive services needed to effectively manage their chronic condition.

8.6.2 Methods

To conduct this study, we used data from the 2000, 2001, and 2002 CAHPS MFFS surveys. For each year, the sample of beneficiaries was drawn from a sampling frame constructed from the EDB. These data were merged with 1999 through 2003 Medicare claims data derived from Medicare Parts A and B claims files using a unique identifier assigned to each beneficiary.

For this analysis, we included only those 2000, 2001, and 2002 MFFS respondents with a diabetes diagnosis as evidenced by ICD-9 codes on the data file. To construct a 12-month interval of claims for each respondent prior to the relevant survey date, we drew from Medicare claims data representing health care utilization from 1999 through 2003. Persons were classified as having diabetes if they met the following criteria based on research conducted by Hebert et al. (1999):

- A claim from inpatient, outpatient, skilled nursing facility, or home health agency with a diagnosis of diabetes (250.xx, 357.2, 362.01, 362.02, or 366.41), excluding women diagnosed during pregnancy

AND one of the following additional criteria:

- One face-to-face acute encounter for diabetes in a hospital inpatient or emergency room setting

OR

- Two face-to-face nonacute encounters at least 7 days apart

We used MFFS claims data to identify beneficiaries diagnosed with depression using ICD-9 codes and developed the following two definitions of depression:

- **Depression #1 (Strict definition).** Persons without bipolar disorder or schizophrenia who meet one of the following criteria:

- 296.2 or 296.3 as the primary diagnosis for an inpatient admission; or
 - 296.2 or 296.3 as any diagnosis for at least two outpatient visits; or
 - 296.2 or 296.3 for any diagnosis for at least one outpatient visit and at least one inpatient admission.
- **Depression #2.** Persons without bipolar disorder or schizophrenia who meet one of the following criteria:
 - A diagnosis of 298, 311, 300.4, 301.12, or 309.1 as the primary diagnosis for an inpatient admission; or
 - An occurrence of 298, 311, 300.4, 301.12, or 309.1 as any diagnosis for at least two outpatient visits; or
 - An occurrence of 298, 311, 300.4, 301.12, or 309.1 as any diagnosis for at least one outpatient visit and at least one inpatient admission.

An additional variable included in the models to represent depression was the mental health component score (MCS) of the SF-12 and an interaction term for diagnosed depression and MCS score. We conducted multivariable regression analyses to examine the relationship between depression and responses to questions related to the Needed Care and Care Quickly composites and the outcomes listed above. Additional variables included in the models were age, survey year, race, gender, proxy, education, dual eligibility, self-reported health, and an illness severity score based on the hierarchical condition categories.

8.6.3 Results and Implications

Overall, we found little relationship between depression and CAHPS questions related to health care utilization and costs. The definition of depression was based on documented ICD-9 codes resulting from medical encounters. Among beneficiaries with diabetes, we found no meaningful association between the CAHPS measures and the outcomes of interest. In addition, the presence of depression as defined by the use of ICD-9-CM codes was also not associated with utilization of health care services. Although depression has been found to confound outcomes among the chronically ill, the issue here may be more one of the ability to identify depressed beneficiaries using claims data. Depression is underdiagnosed among the elderly, so identifying beneficiaries with depression using claims data is challenging. In addition, post-utilization of services for depression may identify beneficiaries whose depression is being treated successfully. These analyses would need to be repeated using a better measure of depression.

SECTION 9 2004 MFFS REASONS FOLLOWBACK PILOT SURVEY

by Judith T. Lynch, B.A, Anne E. Kenyon, M.B.A., Jeremy E. Morton, M.S.,
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Prior to the implementation of the 2004 Medicare CAHPS[®] Fee-for-Service (MFFS) Survey, CMS asked RTI International to implement a “Reasons Followback Pilot Survey” with a subsample of respondents to the main 2004 MFFS survey. The purpose of the Reasons Followback (RFB) Pilot Survey was to determine reasons why some respondents in the main MFFS survey had problems getting care in selected access areas, including problems finding a personal doctor or nurse they can be happy with, seeing specialists, getting care they or their doctors believed necessary, and getting prescription medicines.

9.1 Design and Testing

RTI project staff worked with CMS to develop a set of draft questions to be used in the RFB survey. Most of the questions about reasons for problems with access to care included in the draft RFB pilot survey instrument were taken or adapted from those used in the 2003 Targeted Beneficiary Survey, which CMS conducted in 2003. A few of the questions included in the RFB instrument were developed by RTI, including one about the average time beneficiaries had to wait for an appointment from health providers that they had problems seeing and the number of providers contacted to obtain care or services.

We tested the draft RFB questionnaire from August through September 2004. One of the major findings from the cognitive testing was that some respondents’ answers to the questions about problems with access during the RFB cognitive test interview were not consistent with what they had reported during the mail survey. The project team discussed the problem of inconsistent responses with CMS after questionnaire testing activities were completed and attempted to determine whether the RFB survey should ask only about the specific items for which the respondent reported a big problem during the mail survey (rather than re-asking the problem question for all items), as this approach might yield greater consistency.

As a result of the cognitive testing and subsequent discussions with CMS, we decided to conduct an experiment as part of the RFB pilot survey to better understand the issue of inconsistent reporting of access problems. Therefore, we developed two questionnaires, Version A and Version B, each to be administered to half of the RFB sample. Version A was designed such that the “problem question” for all four access areas would be readministered to the sample members regardless of their answers to the problem question for the specific access area in the main survey. If the respondent reported in the RFB interview that access was a big problem, an accompanying series of follow-up questions for that specific access area was administered. The other half of the sample was administered the Version B set of questions—in this version, we did not re-ask the problem question. Version B sample members were administered only the applicable series of RFB questions about the item or items they reported as being a big problem in the main survey.

Because the questions in Version B were a subset of those in Version A, we developed one computer-assisted telephone interview (CATI) program that incorporated questions and

transition statements from both questionnaire versions. The CATI program included routing logic that brought up the applicable set of introductory and transition statements and questions for each sample member based on whether the member was in the Version A or Version B sample. A copy of the telephone questionnaire, which includes the full set of questions and routing logic for CATI, is included in *Appendix F*.

9.2 Data Collection

The RFB pilot survey is considered a qualitative survey in that the sample was not designed to yield meaningful or representative estimates on a national or state basis. We selected a random sample of 1,000 respondents to the main CAHPS MFFS sample who met specific eligibility criteria—that is, they indicated that they had a big problem getting care in one or more of the designated access areas *and* they gave their consent to be recontacted after the main survey. The sample was limited to a subset of eligible sample members in 11 states. We identified and selected the states with the largest number of respondents citing a big problem with the four access areas by generating and examining unweighted response frequencies from the 2004 main survey. We selected the 10 states that had the largest number of respondents citing problems getting care in the four targeted access areas. We included a sample of respondents from the state of Missouri as requested by CMS. The 11 states included in the RFB sample are California, Florida, Georgia, Michigan, Missouri, North Carolina, New York, Ohio, Pennsylvania, Texas, and Virginia.

To follow up with the RFB sample members as soon as possible after they participated in the main survey, we selected and fielded the RFB sample in three “waves.” The first wave was selected from respondents to the first questionnaire mailing in the main survey; the second wave was selected from those who responded to the second questionnaire mailing. The third wave of the RFB sample consisted of a subsample of beneficiaries who participated in an interview conducted during the telephone follow-up phase of the main survey. One-half of the sample selected in each wave was randomly assigned to receive the Version A instrument during the interview; the other half was assigned to Version B.

RFB pilot survey data collection activities were conducted from November 19, 2004, through March 6, 2005. The pilot survey was implemented by using CATI. One week prior to starting data collection for each wave, we sent an advance letter to sample members describing the survey and alerting them that a telephone interviewer would be calling. Data collection efforts resulted in obtaining a completed RFB interview with 762 sample members, for an overall response rate of 76.2 percent. The response rate for Version A sample members was 78.6 percent and was 73.8 percent for Version B sample members. The response rates varied by data collection wave: 79.0 percent for Wave 1, 69.5 percent for Wave 2, and 74.5 percent for Wave 3. The response rates in the 11 states varied, ranging from 68.3 percent in New York to 88.1 percent in North Carolina.

9.3 Analysis

The RFB pilot survey had two primary objectives. The first objective was to gain a better understanding of the reasons why sample members had problems getting access to care. The second was to determine whether better quality data—that is, more consistent responses between the main and RFB interviews—would result from re-asking the problem question for all access

items or asking only about the access area(s) reported as a big problem in the main survey. After data collection was completed, we assigned a numeric code to all reasons for problems getting access to care that had been entered as open-ended text entries and added those codes to the data file. After constructing the data file, we analyzed the data, examining reasons for access problems overall, by sample type (Versions A and B), and by state. Some selected findings for reasons for problems getting care in the targeted access areas are provided in this section, followed by some results of the experiment to determine whether more consistent data would be reported by re-asking the problem question. Because the RFB was not designed to yield national or state-level estimates, we did not perform tests for statistical significance. The results, therefore, are descriptive. The respondent size (N) for some survey items is very small, especially at the state level; therefore, these findings are not representative of all respondents who reported a big problem with access to care in the 2004 CAHPS MFSS survey.

9.3.1 Problems Finding a Personal Doctor or Nurse

Of the 167 respondents who answered the series of questions about problems finding a personal doctor or nurse in the RFB interview, 13.8 percent indicated that they had contacted one doctor when looking for a doctor in the last 6 months, 15.0 percent had contacted two doctors, 16.8 percent had contacted three doctors, and 25.1 percent had contacted four or more doctors. Approximately 27 percent of the respondents reported that they had not contacted any doctors, and 2.4 percent did not know how many doctors they had contacted.

The number of doctors contacted while looking for a personal doctor or nurse varied in the 11 sample states. In Florida and Michigan, the largest percentage of respondents, 45 percent and 46.2 percent, respectively, reported that they contacted four or more doctors. The largest percentage of respondents in North Carolina, New York, and Texas reported that they did not contact any doctors, whereas the largest percentage of respondents in Ohio contacted one doctor, those in Pennsylvania contacted three doctors, and those in Virginia contacted two doctors. The largest number of doctors contacted by respondents in California was tied between no doctors and four or more doctors. Similarly, the largest number of doctors contacted by respondents in Missouri was tied between one doctor and four or more doctors. The largest number of doctors contacted by respondents in Georgia was tied between no doctors and three doctors.

Respondents cited 32 different reasons for problems finding a personal doctor or nurse they could be happy with. Most reasons, however, had to do with finding a doctor taking Medicare patients or paying for care (including insurance coverage), doctor availability, and dissatisfaction or problem with the doctor(s). The top five reasons cited by the 167 respondents who reported a problem finding a personal doctor or nurse are as follows:

1. Could not find doctor accepting Medicare at all (10.8 percent)
2. There were few doctors in my area (9.6 percent)
3. Dissatisfied with care/doctor did not give care/services/prescribe medicines needed or wanted (9.0 percent)

4. Doctor did not listen/communicate well/spend enough time/explain things so I could understand (8.4 percent)
5. Could not find doctor taking new Medicare patients (7.8 percent)

There was a notable difference in the top reasons sample members could not find a personal doctor or nurse according to sample type—that is, between Version A and Version B respondents. The reason cited most frequently by the 60 Version A respondents was “Dissatisfied with care/doctor did not give care/services/prescribe medicines needed” (13.3 percent). The top reason cited by Version B respondents was “Could not find a doctor accepting Medicare at all.” The second most frequently cited reason by Version A respondents was tied between “Could not find a doctor accepting Medicare at all” and “There were few doctors in my area.” The second most frequently cited reason by Version B respondents was tied between “There were few doctors in my area” and “Could not afford what the doctor wanted to charge.”

The reasons for problems finding a personal doctor or nurse were widely distributed among the respondents in the 11 states in the sample. However, where possible, *Table 9.1* lists the top reason reported in each state. (Note that the size sample for the number of respondents who answered the question about reasons for problems finding a personal doctor or nurse in each state is very small.)

Only 9 (5.4 percent) of the 167 respondents who had a problem finding a personal doctor or nurse reported that it was because they could not get an appointment with a doctor. Out of those nine respondents, three reported that on average it would have taken them between 1 and 2 weeks to get an appointment, three said it would have taken 2 but less than 4 weeks, one said it would have taken 4 weeks or longer but less than 6 weeks, and two said it would have taken 2 months or longer to get an appointment.

The reasons respondents gave for not being able to get a doctor’s appointment when wanted included that they could not reach the doctor by phone, the doctor did not have an appointment available, the doctor did not have an appointment available at a time that was convenient for the respondent, and it would cost too much.

Thirteen (8.0 percent) of the 167 respondents who had a big problem finding a personal doctor or nurse said it was because they could not find a doctor taking any new Medicare patients. Of those, five reported that the doctor’s office gave an explanation for not taking new Medicare patients. One respondent said the doctor’s office explained that it took too long to collect from Medicare, two respondents reported that the “doctor’s office was full,” and two reported that the doctor was not taking any more Medicare patients.

Similarly, 18 (10.8 percent) of the respondents reported that the reason they could not find a personal doctor or nurse was because they could not find a doctor accepting Medicare at all. When asked if the doctor’s office explained the reason they were not accepting Medicare, three of the respondents reported that the doctor’s office explained that Medicare either does not pay, does not pay enough, or takes too long to pay. One respondent said it was because “there is too much paperwork, which would require hiring another person,” and one said that she was advised simply that the doctor was not taking any more patients.

Table 9.1
Top reason respondents in each state could not find personal doctor or nurse

State	Most frequently cited reason	N	Percent gave reason
California	Tie between three reasons: Could not find doctor taking new Medicare patients, Could not find doctor accepting Medicare at all, and Doctor did not listen/communicate well/spend enough time/explain things so I could understand	37	13.5
Florida	Doctor did not listen/communicate well/spend enough time/explain things so I could understand	20	15.0
Georgia	Could not find doctor accepting Medicare at all	19	26.3
Michigan	Tie between two reasons: Could not find a specific type of doctor and Could not find doctor accepting Medicare at all	13	15.4
Missouri	There were few doctors in my area	10	30.0
North Carolina	Tie between two reasons: Could not find doctor accepting Medicare at all and Doctor did not provide good care/service	8	25.0
New York	Tie between three reasons: Could not find doctor taking new Medicare patients, Could not afford what doctor wanted to charge, and Doctor did not listen/communicate well/spend enough time/explain things so I could understand	12	16.7
Ohio	Doctor did not provide good care/service	12	16.7
Pennsylvania	No top reason; each respondent gave different reason	5	N/A
Texas	Tie between two reasons: Could not find doctor taking new Medicare patients and Could not afford what doctor wanted to charge (3 each)	24	12.5
Virginia	There were few doctors in my area	6	50.0

9.3.2 Problems Seeing a Specialist

The series of questions about problems seeing a specialist was administered to 175 respondents. When asked how many specialists they had problems seeing in the last 6 months, 34.3 percent said that they did not have a problem seeing a specialist in the last 6 months, 32.0 percent had problems seeing one specialist, 12.0 percent had a problem seeing two specialists, 13.7 percent had a problem seeing three specialists, and 8.0 percent reported a problem seeing four or more specialists.

We examined the number of specialists that respondents in each state had a problem seeing by excluding those respondents who said they did not have a problem seeing any specialists. The majority of respondents in all states except Michigan and Texas had a problem seeing one specialist. In Michigan, an equal number of respondents said they had a problem

seeing two and three specialists. In Texas, the majority of respondents reported that they had a problem seeing three specialists.

Respondents cited 33 different reasons for not being able to see a specialist. Following are the top five most frequently cited reasons:

1. Could not find a doctor accepting Medicare at all (13.1 percent)
2. Found a doctor but could not get an appointment when needed or wanted (10.9 percent)
3. Could not get a good recommendation or referral (6.9 percent)
4. Could not afford what the doctor wanted to charge (6.3 percent)
5. Doctor did not provide good care/service/dissatisfied with care (5.7 percent)

Eight of 23 respondents who reported that they could not find a specialist accepting Medicare at all provided the doctor's explanation for not accepting Medicare. Four respondents indicated that it was because of a problem with payment/billing issues ("Medicare doesn't pay enough"; "They [the doctors] don't get paid"). One respondent stated, "It is too much of a hassle, they [the doctors] see the card and treat me differently." One respondent reported that it was "corporation policy [not to treat Medicare patients]." Another respondent said it was "a combination of the two (Medicaid and Medicare)" but did not specify the issue, and one respondent said that the doctor would take patients with Medicaid but not Medicare.

Of the 25 sample members who reported a problem getting an appointment with a specialist they needed to see, three respondents reported that, on average, it would have taken from 1 to 2 weeks to get an appointment, seven said it would have taken more than 2 but less than 4 weeks, three indicated that it would have taken 4 weeks or longer but less than 6 weeks, two indicated 6 weeks or longer but less than 8 weeks, and eight respondents said it would have taken more than 2 months to get an appointment.

The top reason that respondents did not always get an appointment with a specialist when they wanted was the "doctor did not have an appointment available." Four respondents reported that the "doctor had too many patients and was too busy," one respondent indicated that the doctor "was incompetent," one said that the doctors had limited knowledge/familiarity with his condition, and another stated that "Medicare patients are not a priority for doctors."

The reasons for problems seeing a specialist were widely distributed among the respondents in the 11 states in the sample. However, where possible, the top reason reported in each state is shown in **Table 9.2**. (Note that the sample size for the number of respondents who answered the question about reasons for problems seeing a specialist in each state is very small.)

Table 9.2
Top reason respondents in each state could not see a specialist

State	Most frequently cited reason	N	Percent gave reason
California	Found doctor but could not get an appointment when needed or wanted	31	16.1
Florida	Found doctor but could not get an appointment when needed or wanted	22	18.1
Georgia	Could not afford charges	12	33.3
Michigan	Tie between four reasons: Found doctor but could not get an appointment when needed or wanted, Could not get a good recommendation or referral, Not satisfied with the care received, and Lack of doctor availability (2 each)	13	15.4
Missouri	No reason cited more than once	9	N/A
North Carolina	No reason cited more than once	7	N/A
New York	Could not find doctor accepting Medicare at all	24	16.7
Ohio	No reason cited more than once	16	N/A
Pennsylvania	Tie between two reasons: Could not get a good recommendation or referral and Found doctor but could not get an appointment when needed or wanted	7	28.6
Texas	Could not find doctor accepting Medicare at all	29	24.1
Virginia	No reason cited more than once	5	N/A

9.3.3 Problems Getting Care Needed

The 143 respondents who were asked the series of questions about problems getting the care, tests, and treatment they needed cited 27 different reasons for not being able to get the care they needed. The top five reasons most frequently cited include the following:

1. Could not afford the charges (15.4 percent)
2. Doctor did not provide good care/service/dissatisfied with care (9.8 percent)
3. Could not get a recommendation or referral (6.3 percent)
4. Unspecified problems with the doctor (4.9 percent)
5. Place I needed to go was not accepting Medicare (4.9 percent)

The reason most frequently cited by Version A respondents was inability to afford the charges. This reason was tied with “Doctor did not provide good care/service” as the top reason cited by Version B respondents.

Of those who reported a problem getting the care they needed, 86 (60.1 percent) reported that they eventually got the care that they needed. Of the 55 (38.5 percent) respondents who did not get the care they needed, the majority (47.3 percent) indicated that their condition got worse as a consequence of not getting the care. Another 10.9 percent said they still do not feel well, and approximately 9 percent said they had to go to an emergency room for care. About 7 percent reported that it took them longer to recover.

As can be seen in **Table 9.3**, “Could not afford the charges” was the top reason for problems getting care cited by respondents in 3 of the 11 states in the sample (New York, Georgia, and Texas). That same reason was tied with another reason as the top reason in California and Florida. **Table 9.3** shows the top reason for each of the 11 states. Note that in some states the reasons were widely distributed, and no single reason was cited more than others. Also, note that the sample size for this question in each of the states is very small.

Table 9.3
Top reason respondents in each state could not get care, tests, or treatment needed

State	Most frequently cited reason	N	Percent gave reason
California	Tie between three reasons: Could not get recommendation or referral, Could not afford charges, and Doctor did not provide good care/service	30	13.3
Florida	Tie between two reasons: Could not get recommendation or referral and Could not afford charges	19	15.8
Georgia	Could not afford charges	9	33.3
Michigan	No reason cited more than once	9	N/A
Missouri	No place to go in my area	11	18.2
North Carolina	No reason cited more than once	4	N/A
New York	Could not afford charges	17	17.6
Ohio	No reason cited more than once	11	N/A
Pennsylvania	No reason cited more than once	8	N/A
Texas	Could not afford charges	20	25.0
Virginia	No reason cited more than once	5	N/A

9.3.4 Problems Getting Prescription Medicines

Of the 342 respondents who reported in the RFB survey that getting prescription medicines was a big problem, the majority (31 percent) had a problem getting five or more prescription medicines. Approximately 18 percent of the respondents had a problem getting three prescription drugs, 14.3 percent had a problem getting two drugs, 12.6 percent had a problem getting four drugs, and 9.9 percent said they had a problem getting one drug. Approximately 12 percent reported that in the last 6 months they did not have a problem getting any prescription medicines, and 2 percent of the respondents did not know how many prescription medicines they had a problem getting in the last 6 months.

Respondents cited 25 different reasons for not being able to get the prescription medicines they needed. The top five reasons most frequently cited are as follows:

1. Cost too much/could not afford (67.5 percent)
2. Insurance would not cover the cost (10.8 percent)
3. Problems getting prescription filled by mail (1.8 percent)
4. The pharmacy lost the prescription or other problem with the pharmacy (1.5 percent)
5. Could not get a prescription from the doctor (1.5 percent)

“Drugs cost too much/could not afford prescription medicines” was the top reason cited by respondents in all 11 states in the sample. “Insurance would not cover the cost of prescription medicines” was the second most frequently cited reasons by respondents in all states except North Carolina and Virginia. In North Carolina, the second most frequently cited reason was tied between “Doctor does not spend enough time with patient” and “Insurance would not cover the cost of prescription medicines” and “Exceeded prescription drugs/pharmacy benefits.” In Virginia, the second most frequently cited reason was also tied between three reasons: “Insurance would not cover the cost of prescription medicine,” “Pharmacy lost prescription/problem with pharmacy,” and “Problems getting prescriptions filled by mail.”

Of the 342 respondents who had a big problem getting the prescription medicines that they needed, 37 (10.8 percent) reported that there was no consequence of not getting the medicines they needed. The other 89.2 percent gave 21 different consequences of not getting the prescription medicines they needed. The five consequences cited most frequently are as follows:

1. The condition got worse (35.4 percent)
2. Eventually got medicine, no consequence specified (12.6 percent)
3. Could not afford the medicine, no consequence specified (9.1 percent)
4. Still do not feel well (8.2 percent)
5. Had to go to the emergency room (6.1 percent)

9.3.5 Results of the Experiment Testing Version A and B

The RFB pilot survey included an experiment to explore which method of following up with main survey respondents in the RFB was most effective. The main research question for this experiment was “Does re-asking the question about a problem getting care for each access area versus not re-asking that question result in more consistent responses in the main and RFB surveys?” The need for examining this issue arose when we tested the questions to be used in the RFB and the majority of respondents’ answers to the question “In the last 6 months, how much of a problem, if any, was it to get...” were inconsistent with their answers to the same question in the main survey.

When selecting the RFB sample, we randomly assigned one-half of the sample to receive a Version A interview and one-half to receive Version B. In the Version A interview, the “big problem” question was re-asked about all four access areas. If the respondent reported in the RFB interview that getting care in that access area was a big problem, we then asked the applicable RFB questions about that access area. In the Version B interview, the problem question was not re-asked. The applicable RFB questions were asked only about the access area(s) that the respondent reported as being a “big problem” in the main survey.

Our analysis of the data from this experiment resulted in determining that we obtained more consistent data from interviews with respondents who participated in a Version B interview. However, even with that version, some respondents’ answers were not consistent with what was reported in the main survey. In our analysis we examined a number of factors, including demographic characteristics and length of time between interviews. We found that the amount of time between participation in the main survey and the RFB affects respondents’ ability to answer about the same incidents and therefore increases the likelihood of inconsistent reporting.

The ideal method for collecting data about problems with access to care would be to ask questions about the incident in the main survey immediately after the question in which it is revealed that the respondent had a big problem with a specific access area. However, that approach may not be feasible for several reasons. First, since the CAHPS MFFS and MA surveys provide information to help beneficiaries decide among Medicare health plan options, it is important that the questionnaires used in both surveys be as comparable as possible. We do not recommend adding the RFB questions to the main survey unless they are also added to the MA survey.

Second, questionnaire length must be considered. The 2004 CAHPS MFFS survey included 93 items. The number of items in the RFB instrument was 55 (excluding the problem question from the main survey). Of course, in the Version B interview, the questionnaire length is based on the number of access areas reported in the main survey as a big problem and on responses to some RFB items, many of which have follow-up questions based on the answer to a preceding question. Adding RFB items to the main survey would increase respondent burden and likely increase unit nonresponse.

As noted, we recommend that Version B of the instrument be used in future implementations of the RFB. If this project will be implemented as a follow-back with MFFS

survey respondents as was done in this pilot survey, fielding the RFB as soon as possible after participation in the main survey is paramount. Even with that, researchers should expect to encounter some problems with inconsistent responses because some Medicare beneficiaries may not be able to recall an incident, problem, or event regardless of the amount of lapse time between interviews.

SECTION 10

IMPACT OF INFLUENZA IMMUNIZATION ON SEASONAL MEDICAL EXPENDITURES AMONG ELDERLY MEDICARE BENEFICIARIES, 2000-2003

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Together, influenza and pneumonia are the fifth leading cause of death in the United States among the elderly (Anderson, 2002). Since 1980, influenza and pneumonia have resulted in an average of approximately 186,000 hospitalizations and 44,000 deaths per year (Thompson et al., 2003, 2004). Mortality and hospitalization rates associated with influenza and pneumonia among persons 85 years of age or older have increased over time, even after adjusting for the aging of the U.S. population (Simonsen et al., 2005; Thompson et al., 2003, 2004). Morbidity and mortality from influenza and pneumonia result in billions of dollars in health care costs each year, the overwhelming majority of which are incurred by the elderly (McBean, Babish, and Warren, 1993; Nichol, 1999; Nichol et al., 1994; Nichol, Wuorenma, and Von Sternberg, 1998). The concentration of health care expenditures for pneumonia and influenza among the elderly is especially troubling as the percentage of the population 65 years or older will rise dramatically over the next 2 decades.

A number of studies have shown that influenza immunization among the elderly can result in substantial improvements in health and reductions in associated health expenditures (Centers for Disease Control and Prevention [CDC], 2002c; Davis et al., 2001; Jefferson et al., 2005; Nichol, 2001; Nichol and Goodman, 2002; Nichol et al., 1999). In a series of studies based on encounter data from a Minnesota managed care plan, Nichol and colleagues found that influenza vaccination was associated with a reduction in the rate of hospitalization and lower inpatient expenditures for acute and chronic respiratory conditions (Nichol, 2001; Nichol et al., 1994; Nichol, Wuorenma, and Von Sternberg, 1998). The authors report that the hospitalization rate for acute and chronic respiratory conditions was between 27 and 39 percent lower (depending on the year) for vaccinated enrollees than for nonvaccinated enrollees, resulting in total savings of between \$15 and \$186 per vaccinated person. In a related study, the authors show that the rate of outpatient visits was lower for vaccinated elderly persons as well (Nichol, Baken, and Nelson, 1999). Hak, Nordin, Mullooly, and colleagues found similar differences in the hospitalization rates and inpatient expenditures between vaccinated and nonvaccinated elderly beneficiaries in other regional managed care plans (Hak, Nordin, and Wei, 2002; Mullooly et al., 1994; Nordin et al., 2001). Finally, Davis and colleagues examined elderly members of a Medicare managed care plan in Hawaii over three seasons in the mid-1990s and report a 20 percent reduction in the pooled hospitalization rate and an inpatient savings of \$80 per flu season among those who were vaccinated (Davis et al., 2001). Although the impact of the flu shot on inpatient service use was significant at the 5 percent level, the cost savings estimate was not.

Most existing studies are based on nonrepresentative samples of elderly beneficiaries usually enrolled in one or a few regional managed care plans, greatly limiting the generalizability of their results to the elderly Medicare population nationally. Existing research typically relies on medical records, claims, or encounter data to identify the immunized subgroup. Because flu shots are often administered for free or at reduced cost in nonmedical settings, administrative databases tend to undercount the number of people receiving vaccinations. The misclassification

of vaccinated beneficiaries as nonvaccinated should logically result in an underestimation of any savings associated with having received a flu vaccination. Further, existing studies based on administrative databases typically rely on a limited set of health status controls, such as prior service use and comorbid condition indicators, which may not fully capture differences in the health status of vaccinated and nonvaccinated beneficiaries. If people who are sick and susceptible to complications from influenza are more likely to get vaccinated, failure to control adequately for differences in health status between vaccinated and nonvaccinated individuals logically should further bias the results by reducing the amount of savings associated with having a flu shot. Finally, existing studies either ignore medical care costs or consider the costs of inpatient services only.

Section 10 presents the results of a study conducted to examine whether the costs of outpatient services decrease with flu vaccination as well, potentially augmenting any observable savings effect. The study sought to address these shortcomings by using self-reported survey data from the Medicare CAHPS[®] Fee-for-Service Survey (MFFS), together with respondents' Medicare claims for all types of services and conditions before and during each flu season. The study relied on self-reports supplemented by Medicare claims to identify immunized individuals. In addition to using multiple health status indicators derived from medical claims, the study also included a self-reported physical health status measure. The expenditure and utilization models were estimated over four flu seasons (1999-2000 through 2002-2003), four service categories (inpatient, hospital outpatient, professional, and the total across all types of services), and the diagnosis of any acute or chronic respiratory conditions.

10.1 Methods

10.1.1 Sources of Data and Study Samples

Our investigation used data from two sources: the 2000 through 2003 CAHPS MFFS surveys and the corresponding Medicare claims files for respondents to these surveys. For the CAHPS MFFS surveys, national probability samples of Medicare beneficiaries were selected each year from the August version of the CMS Enrollment Database (EDB). In each of the 4 years, the population comprised over 30 million Medicare beneficiaries who were enrolled in fee-for-service Medicare for at least the prior 6 months and resided in one of the 50 states, the District of Columbia, or Puerto Rico. Excluded from the sample were beneficiaries with a representative payee (legal proxy) and institutionalized beneficiaries. We excluded respondents under 65 years of age from our analyses, resulting in a combined 4-year total of 416,780 survey respondents. Sampling weights that adjusted for survey nonrespondents according to their demographic characteristics were calculated for each year of the survey and applied to all of the analyses.

10.1.2 Data Collection

The primary mode of data collection for the MFFS survey was self-administered mail questionnaire. Sample members were given the option to complete the questionnaire by telephone to facilitate inclusion of beneficiaries with vision, reading, or other impairments that might otherwise preclude their participation. A Spanish-language version of the questionnaire was also offered. The surveys were initiated with the mailing of a prenotification letter in September, followed by a questionnaire package, a thank you/reminder postcard, a second

questionnaire package to nonrespondents, and conduct of a telephone follow-up of nonrespondents or an Express Mail/FedEx transmission by early February of the following year, if no telephone number was available. The number of respondents (and the response rates) for the surveys was 103,551 (64 percent) in 2000, 117,836 (68 percent) in 2001, 122,955 (71 percent) in 2002, and 120,974 (69 percent) in 2003.

10.1.3 Study Sample

Our study sample included a total of 382,377 noninstitutionalized Medicare beneficiaries, 65 years of age or older, who had no missing data for variables used in the analysis, were enrolled in traditional fee-for-service Medicare, and received Part A or B benefits for at least 6 months of the year during which they were surveyed. Because the study was based on a retrospective analysis of self-reported survey data, the study sample did not include anyone who died during the outcome period. However, people who received an influenza vaccination are shown in this study to have been in poorer health than those who did not and thus are more likely to have died during the outcome period. If dying was associated with an increase in annualized medical care costs, the omission of decedents would lead to an underestimation of cost savings. However, if dying was associated with a decrease in annualized costs, omitting decedents would lead to an overestimation of savings.

10.1.4 Influenza Vaccination

The indicator of whether an individual received an influenza immunization was a composite based on having a Medicare reimbursement claim for an influenza vaccination¹ supplemented, for those without a claim for influenza vaccination, by the beneficiary's self-report in the CAHPS MFFS survey. Those who did not have a Medicare claim for an influenza vaccination and did not indicate on the survey whether they received a flu shot during the previous flu season were assumed to be unvaccinated.

The number and percentage of influenza vaccinations by source of information for each year of the study are presented in *Table 10.1*. The figures show that relying solely on administrative claims records would result in a gross undercounting of beneficiaries who actually received a flu shot. For example, according to Medicare claims, only 38 percent of the sample of 99,324 beneficiaries in 2002-2003 received a flu shot. However, self-reports from the MFFS survey indicate that an additional 34.9 percent of the sample were actually vaccinated. Additional self-reports from the survey ranged from 24 percent to 29.9 percent during the other 3 years. The higher proportion of elderly who reported receiving a flu shot on the survey suggests that some beneficiaries are either getting vaccinated outside of the physician's office or clinic, or that claims for this procedure are not always submitted for Medicare payment. Using both claims and self-reports from the MFFS survey to identify beneficiaries who were vaccinated against influenza indicates an immunization rate among the elderly ranging from 70.7 percent during the 2000–2001 flu season to 73.8 percent in 1999-2000. These rates are substantially higher than the immunization rates among the elderly observed from managed care encounter

¹ Influenza vaccination from claims were identified through CPT codes of 90645-90648, 90657-90660, 90720, 90721, 90724, 90748, G0008, or an ICD-9 code of 9952.

data reported elsewhere in the literature (Davis et al., 2001; Hak, Nordin, and Wei, 2002; Nichol et al., 1994; Nichol, Wuorenma, and Von Sternberg, 1998; Nordin et al., 2001).

Table 10.1
Number of reported influenza immunizations by source of information

	1999-2000		2000-2001		2001-2002		2002-2003	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Reported flu shot	63,939	73.8	67,839	70.7	73,028	72.7	72,400	72.9
Claims-based reports	38,761	44.7	39,167	40.8	48,926	48.7	37,700	38.0
Additional survey reports	25,178	29.1	28,672	29.9	24,102	24.0	34,700	34.9
No report	22,706	26.2	28,084	29.3	27,457	27.3	26,924	27.1
Total	86,645	100.0	95,923	100.0	100,485	100.0	99,324	100.0

NOTE: Flu shot item nonrespondents who did not have a claim for influenza vaccination were coded as nonvaccinated.

SOURCE: RTI analysis of CAHPS MFFS and Medicare claims data, 1999-2004.

10.1.5 Study Outcomes

The outcome measure used for this study is expenditures for Medicare-covered services. Medical expenditures were measured over the 33-week flu season monitored by CDC (from Week 40 of one year to Week 20 of the next year). Medical expenditures were defined for all acute or chronic respiratory conditions using both primary and secondary diagnoses.¹ Acute and chronic respiratory conditions, defined as ICD-9 codes 460, 462, 465, 466, 480-487, 490-496, and 500-518, are the most likely to be affected by influenza vaccination.

Expenditures were measured separately for inpatient, outpatient, and professional services. Inpatient expenditures were extracted from Medicare's MEDPAR claims files, outpatient services provided through institutions were obtained from the Medicare Outpatient Standard Analytic claims files, and professional services provided in all settings were collected from the Medicare Part B claims files. Total reported expenditures are the sum of expenditures from these three files plus expenditures from Medicare's Home Health and Durable Medical Equipment Standard Analytic claims files. Reported expenditures represent the total payment for the claim and include Medicare payment as well as any applicable beneficiary coinsurance, deductible, or reimbursements from other third-party payers.

¹ Expenditures were also measured over the more restrictive set of pneumonia and influenza diagnoses (defined as ICD-9 codes 480-487), as well as a broader set of all diagnoses. The small number of pneumonia and influenza-related claims resulted in smaller and less significant results. The estimated effects of influenza vaccination when measured over total expenditures for all diagnoses were also more difficult to discern. Neither of these results are included in this report.

10.1.6 Confounding Variables

Using information from merged survey and Medicare claims data, we controlled for several factors likely to have a confounding effect on differences in the cost of services between vaccinated and nonvaccinated beneficiaries. These included demographic characteristics (race/ethnicity, age, and gender), education, residence in a major urban area, additional health insurance coverage (supplemental or Medicaid), and whether a beneficiary had a regular source of care.¹ Direct health status measures included self-reported perceived physical health status and prior hospitalization. We also developed two composite health status measures: the Charlson comorbidity index, which summarizes the number of chronic conditions, and the Diagnostic Cost Group Hierarchical Coexisting Condition (HCC) risk score, which measures the effect of demographic characteristics and same-year Part A and B diagnoses on total expenditures. The Charlson index controls for chronic conditions, whereas the concurrent HCC risk score does a better job of capturing variation in expenditures associated with acute conditions (Pope et al., 2004). The higher the HCC risk score or Charlson index, the sicker the beneficiary. An HCC risk score greater than one indicates that the individual is sicker than the average Medicare beneficiary nationally. The composite health status measures were derived from claims data during the 9 months prior to the onset of the 33-week flu season.

The differences in the demographic, socioeconomic, and health status characteristics between those who received a flu shot and those who did not are presented in *Table 10.2*. The results, based on the pooled sample across all 4 years, reveal that beneficiaries who received an influenza vaccination were more likely to be non-Hispanic White, older, male, and better educated. They were also less likely to be dually eligible for Medicaid but more likely to have private supplemental health insurance coverage. In addition, vaccinated beneficiaries were more likely to have a regular source of care. Finally, beneficiaries who received a flu shot were more likely to be in poorer health as measured by all indicators, including self-reported perceived health status, prior hospitalization, and the Charlson and HCC risk score indices. All differences between the vaccinated and nonvaccinated groups, with the exception of urban residency, were significant at the 1 percent level using a two-tailed t-test.

10.1.7 Statistical Analysis

The preceding descriptive results suggest that elderly beneficiaries immunized against influenza were in poorer health and at greater risk for flu-related complications than nonimmunized individuals. Failure to control for the underlying differences in health status, access to health care services, and supplemental insurance between the vaccinated and nonvaccinated samples could result in an underestimation of any observed reduction in expenditures for cost of medical care (or an overestimation of additional expenditures). We used

¹ Because of a large number of item nonresponses for regular source of care on the 2000 CAHPS MFSS survey, this variable was omitted from the 1999-2000 regressions but included in all other years.

Table 10.2
Sample characteristics of beneficiaries with versus without a flu shot

	With a flu shot (N = 277,206)	Without a flu shot (N = 105,171)
Race/ethnicity (%)		***
White	90.3	83.1
Black	4.6	9.8
Hispanic	2.8	4.5
Asian/Pacific Islander	1.4	1.5
American Indian/Native American	0.9	1.1
Age (%)		***
65-69 years	22.2	33.13
70-74 years	26.5	26.97
75-79 years	23.6	19.29
80 years or older	27.7	20.61
Gender (%)		***
Male	42.8	41.5
Female	57.2	58.5
Education (%)		***
Less than high school	25.63	32.20
High school and some college	55.34	53.25
4 years of college or more	19.04	14.54
County of residence (%)		
Urban	67.34	67.37
Nonurban	32.66	32.63
Additional health insurance coverage (%)		***
Supplemental	85.08	73.53
Medicaid	7.35	11.07
None	7.58	15.41
Had a regular source of care	93.23	83.29***
Prior hospitalization (%)	12.84	9.35***
Self-perceived health status (%)		***
Excellent or very good	32.38	38.32
Good	35.89	33.37
Fair or poor	31.74	28.32
Claims-based health status (mean)		
HCC risk score	1.10	0.91***
Charlson index	1.38	0.97***

NOTE: Figures are based on pooled sample over all 4 years. Flu shot item nonrespondents with no claim for influenza vaccination were coded as nonvaccinated. *** indicates significantly different from vaccinated at 1 percent level, ** at 5 percent level, and * at 10 percent level using two-tailed t-test for continuous variables and two-tailed chi-squared test for dichotomous variables.

SOURCE: RTI analysis of CAHPS MFFS and Medicare claims data, 1999-2004.

a regression-based model to control for baseline differences in outcomes that are independent of the marginal effect that vaccination has on expenditures. An ordinary least squares (OLS) model was used to estimate the effect of influenza immunizations on nonlogged medical expenditures.¹ Models were estimated separately for each year and for each type of service.

10.2 Seasonal Variation in Severity of Influenza

We undertook this investigation of immunization for multiple years because we expect that the benefits of receiving a flu shot—that is, lower expenditures for medical treatment of acute and chronic respiratory conditions—would be greater when the flu season was more severe and the vaccine being used was well matched to the active viruses. Thus, to assess the impact of immunization on expenditures for medical care, it is critical to identify and understand the differences in the severity of the flu experience in the four flu seasons studied and how well matched the vaccines were to the circulating viruses. We have relied on CDC’s annual influenza surveillance season summaries from 1999-2000 through 2002-2003 for this overview. *Table 10.3* was prepared from the CDC summaries to characterize the four flu seasons under study (CDC, 2002a,b,d; 2003a,b,c,d).

The CDC influenza surveillance system for the United States consists of seven components:

- Weekly reports from approximately 125 World Health Organization and National Respiratory and Enteric Virus Surveillance System collaborating laboratories located throughout the nation. They report the number of respiratory specimens tested and found to be positive for influenza type A or B. The proportion of tests that are positive is used to monitor the peak period of flu activity.
- Weekly reports from a network of sentinel providers around the country of the number of patients seen with influenza-like illness (ILI). ILI is defined as a temperature greater than 100°F and either a cough or sore throat. The reports are compared with a national standard based on the mean percentage of patients with ILI during noninfluenza season weeks plus 2 standard deviations.
- Weekly reports from 122 city vital statistics offices giving the number of death certificates filed and the number of those for which pneumonia or influenza were listed as the underlying or contributing cause of death. The proportion of deaths due to pneumonia or influenza is compared with a national baseline and an epidemic threshold measure.
- Weekly estimates from state health departments of the level of influenza activity in their states—no activity, sporadic, local, regional, or widespread influenza activity.

¹ We also ran two-part models on the probability of service use and logged expenditures conditional on using services with group- and service-specific smearing factors. Because of heteroskedasticity, however, the retransformed results were not robust.

Table 10.3
Summary of CDC-reported flu season surveillance measures for the four 33-week flu seasons studied: 1999-2000 through 2002-2003

Surveillance measure	1999-2000 ^a	2000-2001 ^b	2001-2002 ^c	2002-2003 ^d
Percent tested positive for flu during flu season	14.9%	11.2%	15.5%	11.2%
Highest weekly percent tested positive	33%	24%	25.7%	24.7%
Percent of A virus/percent of B virus	99.4%/0.6%	53.6%/46.4%	87.5%/12.5%	56.4%/43.6%
Number of consecutive weeks pneumonia and influenza mortality exceeded epidemic threshold	13 weeks	0 weeks	5 weeks	0 weeks
Highest weekly mortality rate for pneumonia and influenza	11.2%	4.0%	9.1%	8.3%
Highest weekly percent of visits for influenza-like illness	5.7% ^e	4.2% ^f	3.2%	3.2%
Highest weekly number of states reporting regional or widespread flu	44 states	38 states	40 states	35 states
Percent of confirmed influenza strains matched to the vaccine in use	A: 83.8% B: 100.0% Overall: 84.6%	A: 95.0% B: 11.0% Overall: 57.7%	A: 100.0% B: 4.9% Overall: 63.2%	A: 94.9% B: 99.6% Overall: 96.7%
Influenza season characterized by CDC	Moderate to severe ^g	Mild	Mild to moderate	Mild

^a Influenza information for the 1999-2000 season is from the following source unless otherwise indicated: Centers for Disease Control and Prevention (CDC): 1999-2000 Influenza Season Summary. 2002. Available at: <http://www.cdc.gov/ncidod/diseases/flu/weeklyarchives1999-2000/99-00summary2.htm>. Accessed November 29, 2005.

^b Influenza information for the 2000-2001 season is from the following source unless otherwise indicated: Centers for Disease Control and Prevention (CDC): 2000-2001 Influenza Season Summary. 2003. Available at: <http://www.cdc.gov/ncidod/diseases/flu/weeklyarchives2000-2001/00-01summary.htm>. Accessed November 29, 2005.

^c Influenza information for the 2001-2002 season is from the following source unless otherwise indicated: Centers for Disease Control and Prevention (CDC): 2001-2002 Influenza Season Summary. 2002. Available at: <http://www.cdc.gov/flu/weekly/weeklyarchives2001-2002/01-02summary.htm>. Accessed November 29, 2005.

^d Influenza information for the 2002-2003 season is from the following source unless otherwise indicated: Centers for Disease Control and Prevention (CDC): 2002-2003 Influenza Season Summary. 2003. Available at: <http://www.cdc.gov/ncidod/diseases/flu/weeklyarchives2002-2003/02-03summary.htm>. Accessed November 29, 2005.

^e Source: Centers for Disease Control and Prevention (CDC): 1999 Sentinel Provider Data Summary for All Regions. 2003. Available at: <http://www.cdc.gov/ncidod/diseases/flu/regions1999-2000/senregallregion99-00.htm>. Accessed November 29, 2005.

^f Source: Centers for Disease Control and Prevention (CDC): 2000-01 Sentinel Provider Data Summary for All Regions. 2003. Available at: <http://www.cdc.gov/ncidod/diseases/flu/regions2000-2001/senregallregion00-01.htm>. Accessed November 29, 2005.

^g Source: Centers for Disease Control and Prevention (CDC): Surveillance for influenza—United States, 1997-98, 1998-99, and 1999-00 seasons. MMWR 51(SS07):1-10, Oct. 2002.

- Laboratory-confirmed influenza-associated mortality in persons under 18 years of age included in the national notifiable disease surveillance system.
- Laboratory-confirmed influenza-related hospitalizations collected by the Emerging Infections Program Influenza Project for persons under 18 years of age in 11 metropolitan areas of 10 states.
- Estimates of laboratory-confirmed influenza hospitalization rates provided every 2 weeks by the New Vaccine Surveillance Network for children under 5 years of age in one county in each of three different states.

For all but one of the surveillance measures available from CDC, the 1999-2000 flu season was the most severe of the four we studied. The 1999-2000 flu season had the highest weekly proportion testing positive for influenza, the highest weekly influenza and pneumonia mortality rate, the highest weekly rate of physician visits for influenza-like illness, the largest number of weeks in which influenza and pneumonia mortality exceeded the epidemic threshold, and the largest number of states reporting regional or widespread influenza activity. The 1999-2000 flu season was second only to the 2001-2002 season with respect to the proportion of persons testing positive for the flu. The 2001-2002 flu season was the second most severe according to the other measures of flu season severity. The 2001-2002 flu season was characterized by CDC as being mild to moderate, whereas the 2000-2001 and 2002-2003 flu seasons were both characterized as being mild. CDC characterized the 1999-2000 flu season as moderate to severe.

The two most severe seasons out of the four we examined also had in common the fact that the majority of positive tests were overwhelmingly the type A virus, which has historically been the most virulent for humans. The overall match of the trivalent vaccine in use during the 2002-2003 season to the viruses active at that time was by far the best of the 4 years under study, being 95 percent or more matched for both virus types. During that season, however, much of the active virus was of the less virulent B type. The 1999-2000 season had virtually only type A virus strains circulating, but the vaccine was not quite matched to 85 percent of them. The worst matches of the vaccine to the circulating viruses occurred during the 2000-2001 (57.7 percent) and 2001-2002 (63.2 percent) flu seasons.

10.3 Results

10.3.1 Descriptive Results

Table 10.4 presents unadjusted mean seasonal expenditures for beneficiaries who received a flu shot versus those who did not. According to the results, beneficiaries who received an influenza vaccination had higher unadjusted seasonal medical expenditures than those who were not immunized against the flu virus. The results are consistent across all types of services and all years. For example, during the most recent flu season under review, average seasonal expenditures for all services among beneficiaries with a flu shot were \$698, compared with \$501 among those who were not immunized. During the same period, immunized beneficiaries incurred a total cost of \$533 for inpatient services, compared with \$406 for nonimmunized

Table 10.4
Unadjusted mean expenditures for acute or chronic respiratory conditions for Medicare-covered services by immunization status

	1999-2000			2000-2001			2001-2002			2002-2003		
	Flu shot (\$)	No flu shot (\$)	Diff. (\$)									
All services	594.31	460.37	134.50	565.92	368.73	197.20	690.84	493.04	197.80	697.69	500.57	197.10
Inpatient services	471.55	385.47	86.07	436.55	298.35	138.20	516.78	394.83	121.90	533.21	405.76	127.40
Outpatient services	25.16	16.24	8.92	24.28	14.83	9.46	34.76	18.71	16.04	40.32	22.47	17.85
Professional services	36.58	25.91	10.68	37.63	23.48	14.15	50.28	31.66	18.62	31.24	18.92	12.32

NOTE: Expenditures measured over claims with primary or secondary diagnosis for acute or chronic respiratory conditions only. Expenditures based on services used during the 33-week flu season as reported by the Centers for Disease Control and Prevention (CDC). Flu shot item nonrespondents with no claim for influenza vaccination were coded as nonvaccinated. Total expenditures include expenditures for home health and durable medical supplies. All differences in expenditures between beneficiaries with versus without a flu shot were significant at 1 percent level using two-tailed t-test.

SOURCE: RTI analysis of CAHPS MFFS and Medicare claims data, 1999-2004.

beneficiaries. Comparable expenditures were \$40 and \$22, respectively, for outpatient services and \$31 and \$19 for professional services. The observed differences in expenditures between vaccinated and nonvaccinated elderly beneficiaries were statistically significant at the 1 percent level using a two-tailed t-test for all types of services and all years. The higher medical expenditures among immunized beneficiaries are likely due in part to their poorer health status. Again, failure to control for the differences in health status between the two groups will result in an underestimation of any savings associated with influenza vaccination.

10.3.2 Regression Results

The results from the regression model are summarized in *Table 10.5*. The table shows the marginal expenditures associated with influenza vaccination after controlling for baseline differences in beneficiary demographic, socioeconomic, and health status characteristics.¹ The results show a reversal of the unadjusted mean differences presented previously. After controlling for the baseline characteristics of the two groups, total medical expenditures measured over all services were lower among elderly beneficiaries with a flu shot relative to those without a flu shot. The magnitude and statistical significance of the savings, however, vary depending on the severity of the virus and the match between the vaccine and the strain of the influenza virus. During 1999-2000, for example, expenditures for all services among the immunized sample were \$88 lower on average than among the nonimmunized beneficiaries. Similarly, during 2002-2003, a season characterized by a relatively close match between vaccine and strain, immunization resulted in a \$103 decline on average in expenditures for all services. The estimated savings during both of these seasons were statistically significant at the 5 percent level or higher. Influenza vaccinations were associated with a reduction in total medical expenditures during the other two flu seasons as well, although the estimated savings were smaller and statistically insignificant.

Table 10.5
Impact of influenza vaccination on seasonal expenditures for acute or chronic respiratory conditions for Medicare-covered services

	1999-2000 (\$)	2000-2001 (\$)	2001-2002 (\$)	2002-2003 (\$)
All services	-88.29**	-23.90	-31.23	-103.48***
Inpatient services	-102.92***	-43.61*	-64.47**	-130.47***
Hospital outpatient services	1.37	1.76	7.64***	6.99***
Professional services	0.56	3.89***	7.02***	3.09***

NOTE: Figures derived from regression models. Expenditures measured over claims with primary or secondary diagnosis for acute or chronic respiratory conditions only. Expenditures based on services used during the 33-week flu season as reported by the Centers for Disease Control and Prevention (CDC). Flu shot item nonrespondents with no claim for influenza vaccination were coded as nonvaccinated. Total expenditures include expenditures for home health and durable medical supplies. *** indicates significance at 1 percent level, ** at 5 percent level, and * at 10 percent level using two-tailed t-test.

SOURCE: RTI analysis of CAHPS MFFS and Medicare claims data, 1999-2004.

¹ Regression coefficients and standard errors are presented for each year in *Appendix G*.

When the aggregated results are decomposed by type of service, the regression analysis reveals a contradictory relationship of flu shots with inpatient and ambulatory services. Influenza vaccinations are associated with a decline in expenditures for inpatient services but a slight increase in expenditures for outpatient and professional services. Elderly beneficiaries with a flu shot had lower expenditures for inpatient services in all years, again most notably in 1999-2000 (\$103) and 2002-2003 (\$130). The reduction in expenditures for inpatient services was statistically significant at the 10 percent level or higher in all years. By contrast, those who received a flu shot had higher expenditures for outpatient and professional services in all years, with the association being less correlated with the severity of the virus or the match between vaccine and strain. For example, flu shots were associated with approximately \$7 higher expenditures for outpatient services in both 2001-2002 and 2002-2003. Similarly, immunized beneficiaries had between \$3 and \$7 higher expenditures for professional services between 2000-2001 and 2002-2003. All of these results were significant at the 1 percent level. In 1999-2000, the season with the most severe virus, the correlation between flu shot and ambulatory spending was small and statistically insignificant.

To evaluate the relative magnitude of the savings, the impact of influenza vaccination on medical expenditures is expressed as a percentage of average medical spending over all diagnoses in **Table 10.6**. Flu shots resulted in a slightly more than 3 percent reduction in total medical expenditures over all diagnoses in 1999-2000 and 2002-2003. The reduction in total expenditures for inpatient services ranged from 3.5 percent in 2000-2001 to 8.2 percent in 2002-2003, depending on the severity of virus and the closeness of the vaccine-virus strain match. By contrast, total expenditures for outpatient and professional services increased by only 1.5 percent or less across the four seasons.

Table 10.6
Impact of influenza vaccination as a percentage of mean seasonal expenditures for all diagnoses

	1999-2000 (%)	2000-2001 (%)	2001-2002 (%)	2002-2003 (%)
All services	-3.06**	-0.82	-0.84	-3.12***
Inpatient services	-7.55***	-3.50*	-4.21**	-8.17***
Hospital outpatient services	0.35	0.45	1.50***	1.29***
Professional services	0.06	0.37***	0.50***	0.35***

NOTE: Savings are expressed as a percentage of expenditures over all diagnoses. Expenditures measured over claims with primary or secondary diagnosis for acute or chronic respiratory conditions only. Expenditures based on services used during the 33-week flu season as reported by the Centers for Disease Control and Prevention (CDC). Flu shot item nonrespondents with no claim for influenza vaccination were coded as nonvaccinated. Total expenditures include expenditures for home health and durable medical supplies. *** indicates significance at 1 percent level, ** at 5 percent level, and * at 10 percent level using two-tailed t-test.

SOURCE: RTI analysis of CAHPS MFFS and Medicare claims data, 1999-2004.

10.4 Conclusions

Healthy People 2010, the U.S. Department of Health and Human Services' (DHHS, 2000) compendium of opportunities for improving the nation's health, sets an ambitious agenda for the nation's health care systems with respect to its goals for increasing the appropriate use of selected health services, improving health, and reducing health care expenditures for unnecessary care. Increasing the proportion of adults 65 years of age or older who receive influenza and pneumococcal immunization is among the 467 objectives detailed in the compendium. Additionally, the Medicare Quality Improvement Organizations under contract to CMS have been charged in their Seventh Scope of Work to reduce the proportion of Medicare beneficiaries who fail to be immunized (CMS, 2004). In fact, because influenza more seriously affects the elderly and those with chronic medical conditions, the Advisory Committee on Immunization Practices recommends annual influenza immunization for all elderly persons and persons in poor health. In support of these efforts, influenza and pneumonia immunizations are fully covered benefits under Medicare Part B.

This study offers further evidence to suggest that increasing the proportion of the elderly population who get vaccinated against influenza should result in lower expenditures for inpatient services. The lower spending for inpatient services should be more than sufficient to offset the small increase in spending for outpatient and professional services, resulting in a net reduction in total expenditures. However, the magnitude of the total savings will be influenced by both the virulence of the influenza virus and the match between the flu vaccine and the prevalent strains. During flu seasons that are characterized by a virulent virus or a close match between the vaccine and prevalent strains, increased immunizations should result in modest net savings in total seasonal expenditures of approximately 3 percent on average. However, savings may be negligible when the virus is relatively less severe or the vaccine is not effective against the dominant strain.

SECTION 11 REFERENCES

Anderson, R.N.: Deaths: Leading causes for 2000. National Vital Statistics Report. Vol. 50, No. 16. National Center for Health Statistics, Public Health Service. Washington. U.S. Government Printing Office, Sept. 2002.

Binder, D.A.: On the variances of asymptotically normal estimators from complex surveys. Int Stat Rev 51:279-292, 1983.

Brody, E., West, N., and Bernard, S.: Implementation of Medicare CAHPS[®] Fee-for-Service Survey: Final Subgroup Analysis Report for the 2004 Survey. Report prepared for the Centers for Medicare & Medicaid Services. Research Triangle Park, NC. RTI International, 2005.

Brody, E., West, N., Carpenter, L., et al.: Medicare Fee-for-Service National Implementation Subgroup Analysis: Chartbook of Results. Report prepared for the Centers for Medicare & Medicaid Services. Research Triangle Park, NC. RTI International, 2003.

Campbell, L., Brown, G., Carpenter, L., et al.: Analyzing marginal response rates in the CAHPS[®] Medicare Fee-for-Service Survey. Proceedings of the Joint Statistical Meetings of the American Statistical Association, 2005.

Campbell, L., Dimitropoulos, L.L., Carpenter, L., et al.: The costs and benefits of improving response rates of the CAHPS[®] Medicare Fee-for-Service Survey. Proceedings of the Joint Statistical Meetings of the American Statistical Association, 2004.

Centers for Disease Control and Prevention (CDC): 1999-2000 Influenza Season Summary. 2002a. Available at: <http://www.cdc.gov/ncidod/diseases/flu/weeklyarchives1999-2000/99-00summary2.htm>. Accessed November 29, 2005.

Centers for Disease Control and Prevention (CDC): 2001-2002 Influenza Season Summary. 2002b. Available at: <http://www.cdc.gov/flu/weekly/weeklyarchives2001-2002/01-02summary.htm>. Accessed November 29, 2005.

Centers for Disease Control and Prevention (CDC): Prevention and control of influenza: Recommendations of the advisory committee on immunization practices (ACIP). MMWR 51(RR03):1-31, April 2002c.

Centers for Disease Control and Prevention (CDC): Surveillance for influenza—United States, 1997-98, 1998-99, and 1999-00 seasons. MMWR 51(SS07):1-10, Oct. 2002d.

Centers for Disease Control and Prevention (CDC): 1999 Sentinel Provider Data Summary for All Regions. 2003a. Available at: <http://www.cdc.gov/ncidod/diseases/flu/regions1999-2000/senregallregion99-00.htm>. Accessed November 29, 2005.

Centers for Disease Control and Prevention (CDC): 2000-01 Sentinel Provider Data Summary for All Regions. 2003b. Available at: <http://www.cdc.gov/ncidod/diseases/flu/regions2000-2001/senregallregion00-01.htm>. Accessed November 29, 2005.

Centers for Disease Control and Prevention (CDC): 2000-2001 Influenza Season Summary. 2003c. Available at: <http://www.cdc.gov/ncidod/diseases/flu/weeklyarchives2000-2001/00-01summary.htm>. Accessed November 29, 2005.

Centers for Disease Control and Prevention (CDC): 2002-2003 Influenza Season Summary. 2003d. Available at: <http://www.cdc.gov/ncidod/diseases/flu/weeklyarchives2002-2003/02-03summary.htm>. Accessed November 29, 2005.

Centers for Medicare & Medicaid Services (CMS): Quality Improvement Organizations (QIOs) Statement of Work. 2004. Available at: <http://cms.hhs.gov/qio/2b.pdf>. Accessed November 29, 2005.

Cioffi, M.J., Cleary, P.D., Ding, L., et al: Analysis of Case-Mix Strategies and Recommendations for Medicare Managed Care CAHPS. Final report prepared for the Health Care Financing Administration, Contract No. 500-95-007, Task 9. Boston, MA. Harvard Medical School, Department of Health Care Policy, 2001.

Cioffi, M.J., Cleary, P.D., Ding, L., et al.: Analysis of Case-Mix Strategies and Recommendations for Medicare Managed Care CAHPS. Final report prepared for the Centers for Medicare & Medicaid Services, Contract No. 500-95-007, Task 9. Boston, MA. Harvard Medical School, Department of Health Care Policy, 2004.

Davis, J.W., Lee, E., Taira, D.A., et al.: Influenza vaccination, hospitalizations, and costs among members of a Medicare managed care plan. Med Care 39(12):1273-1280, Dec. 2001.

Deville, J.C., and Sarndal, C.E.: Calibration estimation in survey sampling. J Am Stat Assoc 87:376-382, 1992.

Dillman, D.A.: Mail and Internet surveys: The Tailored Design Method, 2nd ed. New York. Wiley, 2000.

Dimitropoulos, L.L., Campbell, L., and Iannacchione, V.G.: The effect of method of delivery and response propensity on response to a nonresponse follow-up. Proceedings of the Joint Statistical Meetings of the American Statistical Association, 2003.

Elliott, M.N., Solomon, M., Suttorp, M., et al.: Geographic Unit Recommendations for National CAHPS[®] Medicare Fee-for-Service Surveys. Report prepared for the Centers for Medicare & Medicaid Services. 2000.

Hak, E., Nordin, J., Wei, F.: Influence of high-risk medical conditions on the effectiveness of influenza vaccination among elderly members of three large managed-care organizations. Clin Infect Dis 35:370-377, Aug. 2002.

Hebert, P.L., Geiss, L.S., Tierney, E.F., et al.: Identifying persons with diabetes using Medicare claims data. Am J Med Qual 14(6):270-277, 1999.

Iannacchione, V., Pugh, N., Lance, T., et al.: Evaluating mode effects in the Medicare CAHPS® Fee-for-Service Survey. Proceedings of the Joint Statistical Meetings of the American Statistical Association, 2002.

Jefferson, T., Rivetti, D., Rivetti, A., et al.: Efficacy and effectiveness of influenza vaccines in elderly people: A systematic review. Lancet 366:1165-1174, Oct. 2005.

McBean, A.M., Babish, J.D., and Warren, J.L.: The impact and cost of influenza in the elderly. Arch Intern Med 153:2105-2111, Sept. 1993.

Mullooly, J.P., Bennett, M.D., Hornbrook, M.C., et al.: Influenza vaccination programs for elderly persons: Cost-effectiveness in a health maintenance organization. Ann Intern Med 121(12):947-952, Dec. 1994.

Nichol, K.L.: The additive benefits of influenza and pneumococcal vaccinations during influenza seasons among elderly persons with chronic lung disease. Vaccine 17(1001):91-93, July 1999.

Nichol, K.L.: Cost-benefit analysis of a strategy to vaccinate healthy working adults against influenza. Arch Intern Med 161(5):749-759, March 2001.

Nichol, K.L., Baken, L., and Nelson, A.: Relation between influenza vaccination and outpatient visits, hospitalization, and mortality in elderly persons with chronic lung disease. Ann Intern Med 130(5):397-403, March 1999.

Nichol, K.L., Baken, L., Wuorenma, J., et al.: The health and economic benefits associated with pneumococcal vaccination of elderly persons with chronic lung disease. Arch Intern Med 159:2437-2442, 1999.

Nichol, K.L., and Goodman, M.: Cost-effectiveness of influenza vaccination for healthy persons between ages 65 and 74 years. Vaccine 20(Suppl 2):S1-S4, May 2002.

Nichol, K.L., Margolis, K.L., Wuorenma, J., et al.: The efficacy and cost effectiveness of vaccination against influenza among elderly persons living in the community. New Eng J Med 331(12):778-784, Sept. 1994.

Nichol, K.L., Wuorenma, J., and Von Sternberg, T.: Benefits of influenza vaccination for low-, intermediate-, and high-risk senior citizens. Arch Intern Med 158:1769-1776, Sept. 1998.

Nordin, J., Mullooly, J., Poblete, S., et al.: Influenza vaccine effectiveness in preventing hospitalizations and deaths in persons 65 years or older in Minnesota, New York and Oregon: Data from 3 health plans. J Infect Dis 184:665-670, 2001.

Pope, G.C., Kautter, J., Ellis, R.P., et al.: Risk adjustment of Medicare capitation payments using the CMS-HCC model. Health Care Financ Rev, Summer 2004.

RTI International: SUDAAN Language Manual (release 9.0). Research Triangle Park, NC. RTI International, 2004. Available at: <http://www.rti.org/sudaan/>. Accessed November 3, 2005.

Simonsen, L., Reichert, T.A., Viboud, C., et al.: Impact of influenza vaccination on seasonal mortality in the US elderly population. Arch Intern Med 165:265-272, Feb. 2005.

Singh, A.C., and Folsom, R.E.: A generalized exponential model of sampling weight calibration for extreme values, nonresponse, and poststratification. Proceedings of the Section on Survey Research Methods of the American Statistical Association, 2000.

Thompson, W.W., Shay, D.K., Weintraub, E., et al.: Mortality associated with influenza and respiratory syncytial virus in the United States. JAMA 289(2):179-186, 2003.

Thompson, W.W., Shay, D.K., Weintraub, E., et al.: Influenza-associated hospitalizations in the United States. JAMA 292(11):1333-1340, 2004.

U.S. Department of Health and Human Services (DHHS): Healthy People 2010: Understanding and Improving Health, 2nd ed. Washington. U.S. Government Printing Office, 2000.